DOCUMENT RESUME

ED 148 046 EC 103 087

AUTHOR	Reggio, Kathryn D.; And Others
TITLE	Physical Health: Individualized Health Incentive Program Modules for Physically Disabled Students for Grades Kindergarten Through Twelve. Teacher's Edition.
INSTITUTION	Human Resources Center, Albertson, N.Y.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
BUREAU NO	H233556
PUB DATE	77
GRANT	OEG-0-73-7065
NOTE	277p.; For related information, see EC 103 085 - EC 103 088 and EC 101 865
AVAILABLE FROM	Human Resources School, Albertson, New York 11507 ($15.95 for the 5 modules)
EDRS PRICE	MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS	*Curriculum Guides; *Dental Health; *Disease Control; Elementary Secondary Education; Health Activities; *Health Education; *Nutrition; *Physically Handicapped; Sensory Experience

ABSTRACT

Physical health is the focus of the third in a series of health education curriculum guides for physically handicapped students (grades K-12). An introductory section touches on physical health activities at the Human Resources School (Albertson, New York) and includes photographs of good health habits. The remainder of the document provides modules for the following topics: individual health status (including fitness and the physiology of disability); nutrition (such as weight control, bowel problems, and independent meal preparation); sensory perception (including body image); dental health; and disease prevention and control (including immunizations and venereal disease). Each module provides specific background material for various physical disabilities, and includes listings of concepts, student activities, and student self evaluation. (CL)

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Physical Health

INDIVIDUALIZED HEALTH INCENTIVE PROGRAM MODULES FOR PHYSICALLY DISABLED STUDENTS FOR GRADES KINDERGARTEN THROUGH TWELVE

TEACHER'S EDITION

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HUMAN RESOURCES SCHOOL
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1977

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EC10 30087

Grant No. OEG-O-73-7065
Project No. H 233556

The project presented herein was performed pursuant to a grant from the U. S. Office of Education, Department of Health, Education, and Welfare. However the opinions expressed herein do not necessarily reflect the position or policy of the U. S. Office of Education, and no official endorsement by the U. S. Office of Education should be inferred.

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FOREWORD

I am delighted to congratulate the distinguished members of the Human Resources School faculty whose efforts and dedication over the last three years have culminated in the publication of these Health Education modules.

Health Education is one of the most important components of any school's curriculum. It is not enough for us to prepare our children to enter college or the world of work; we must prepare them to enter the arena of life equipped with a full understanding of their bodies and minds. Topics like mental health, family life, safety, and nutrition are as important to the growing disabled child as they are to the able-bodied youngster.

My responsibilities as Chairman of the White House Conference on Handicapped Individuals have given me a clear perspective on the status of the severely disabled in America's communities. Throughout the nation, states are enacting legislation to mainstream disabled children into neighborhood public schools. The modules will go a long way in preparing teachers in public schools in New York State and throughout the country to provide handicapped children with a proper health education.

Henry Viscardi, Jr.
Human Resources Center

ACKNOWLEDGMENTS

I would like to acknowledge with special appreciation the extraordinary contributions of the project team: Josephine Davidson, Donna Shooltz, Marilyn Hawkins, Rose Grabelsky, Dr. Leon Greenspan, and Harriet Findlay.

Special recognition goes to the dedicated faculty members who contributed activities, worked with the students, evaluated and revised these modules: Carol D'Ambrosio, Kathy Finnigan, Susan Gordon, Edna Humbert, Patricia Iannucci, Jeanne Kuskowski, Sheila Mohrman, Barbara Ringewald, Eileen Singleton, Barbara Steinberg, Jeanne Wirtzer, Marion Seidman, William Lupardo.

Gratitude is expressed to our guest speakers and consultants Lorraine Bertan, Dr. Marvin King, Evelyn Kolonoski, Dr. Marie Meier, Dr. Emanuel Plesent, and Warren Eikelberg who generously shared their experiences and advice with the students and the project team.

Mitchell Carucci deserves a special thanks for the photography.

Special appreciation is extended to the research librarian, Ruth Velleman, for assistance in obtaining many specialized materials used by the project team and the students.

Sincere thanks to the capable project secretary, Susan Kurtzke.

For invaluable guidance in the technicalities of developing our project, I wish to add a note of appreciation to Dr. Edwin Martin, Dr. Max Mueller, Melville Appell, and Mel McNeill of the Bureau of Education for the Handicapped in Washington.

The cooperation of the New York State Education Department and the Department of Health and Drug Education enabled us to build further on their excellent Health Education curriculum.

Final gratitude is expressed to our wonderful administrators during the course of the project, Richard Switzer, Dr. Henry Bormann, and Robert Gibney.

Kathryn D. Reggio
Project Director

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INTRODUCTION

The purposes of this project are to adapt the New York State Health Education curriculum to the special needs of physically disabled students in grades kingergarten through twelve, and to organize educational information about physical disability.

This module, Physical Health, is one of the five areas or strands of health education which have been adapted. The others are Safety and Survival Education, Mental Health and Family Life Education, Environmental and Community Health, and Sociological Health Problems.

Under each topic of the New York State Health Education curriculum, individualized health incentive program modules have been adapted for students having the physical disabilities included at Human Resources School.

To deal with the mental health needs of children in the school whose disabilities included 33 different handicaps or diseases, this adapted curriculum considers them under nine broad categories of health problems.

1. Lack of function of the involuntary nervous system
2. Diminution or absence of feeling in the extremities, paralysis, wearing braces, confinement to a wheelchair, poor cordination
3. Generalized muscle weakness
4. Arm and joint immobility
5. Prosthetic limbs
6. Fragility of bones
7. Diminutive size
8. Poor circulation
9. Inability to control bleeding

Each health problem is represented by the underlined disability listed next to it, but it is felt that the modules could also apply to the other disabilities which are listed with the underlined disability.

Thus, teachers and students could use the activities of the module for any of the other disabilities in the same category.

This program builds in the incentive by incorporating student self-evaluation activities and a number of motivational procedures. It is believed that student self-evaluation based on individually chosen relevant learning activities provides the greatest incentive for learning and leads to a stronger desire to improve.

The three columns on each right-hand page are directed toward the student, and the student activities and self-evaluations are written in terms of behavioral objectives. Only the teacher's module contains the background information on the left-hand page.

Dysautonomia

Spina Bifida, Post-poliomyelitis, Quadraparesis, Paraplegia, Hemiplegia, Spastic Paraplegia, Dystonia, Legg-Calve-Perthes Disease, Seizure Disorders

Muscular Dystrophy, Amyotonia Congenita, Kugelberg-Welander Disease, Charcot-Marie-Tooth Disease

Arthrogryposis, Rheumatoid Arthritis

Congenital Amputee, Limb Deformities

Osteogenesis Imperfecta

Achondroplasia

Congenital Cardiac Conditions, Rheumatic Heart Disease

Hemophilia, Thalassemia, Sickle Cell Disease

This curriculum is conceived of as separate modules for each topic. It has been printed and bound in two forms – the first, a limited number of the separate modules, and the second with the modules combined into bound booklets. This second form was necessitated by budgetary limitations. Human Resources accepted the responsibility of sharing the finished product with all the participating agencies, school districts, and consultants who cooperated with the committee during the project's development. This was possible only by binding the modules as booklets instead of packaging each one separately in its own packet or binder.

The suggested method of use is to have each student individually choose the topic he finds pertinent and follow the related activities and student self-evaluations.

The student's modules can be printed without the teacher background information.

The activities were designed for use with the severely physically disabled students at Human Resources School. The school has certain decided advantages for implementing a special health education curriculum:

1. A number of students with similar disabilities who can work together on related activities.

2. Accommodated rooms, furniture, shelves, elevators, automated doors, etc.

3. Specially adapted: library, swimming pool, gymnasium, stage, auditorium, cafeteria, art room, toilets, open classroom, home economics room, greenhouse.

4. Services of a physician, school-nurse-teacher, practical nurse, physical therapist, dental clinic, orderly, psychologist, speech therapist, and 200 volunteers.

5. Equipment: motorized wheelchairs, rolling litters, rolling stretchers.

The staff of the school has found that students who might otherwise be homebound can be physically accommodated. When the physical accommodations are provided, the intellectual and social needs can be taken care of. The health project committee does believe that, although it was developed in a special setting, this health curriculum also has a wider application to schools or classes having only a few students with physical disabilities.

Although the average school may not have all the suggested accommodations, the background information pages tell the teachers what their students with certain disabilities might be expected to do and what special needs must be considered in their health education.

School districts wishing to conform to the law mandating equal opportunity for education for the handicapped may be able to adapt their facilities on a smaller scale as the needs arise.

In inaugurating a health curriculum at Human Resources School, a great deal of time had to be spent on the most basic general material. For a number of reasons, the students at Human Resources School knew less about health than the average student.

The opportunity to spend more time than the minimal amount required by the state had never presented itself before. Students had missed a great deal of both academic and health education through long absences and hospital stays. The fact that someone else had had to perform a great deal of their physical care had made it unnecessary to learn basic hygiene or health habits. This situation had also delayed or discouraged the development of individual initiative.

The curriculum in physical health recommended for physically disabled students and followed as a basic course at Human Resources School includes the content topics given in the New York State Health Education Curriculum. We feel that they are excellent. As a matter of fact, our experience has been that our students needed a great deal more time devoted to the content than was required by the state – and we did allow the necessary time.

The basic assumption at Human Resources School is that our students are normal young people who happen to have a disability. They have all the physical, emotional, and intellectual needs of other normal students, plus some additional ones engendered by their disability. We therefore regard our curriculum as an addition to the New York State curriculum, not a replacement, and recommend that both the basic course of study for New York State, and the units developed at Human Resources School be used together.

A curriculum in health education for physically disabled, intellectually average students should include all the knowledge and topics in the regular curriculum so that disabled students with limited experience will be able to understand the standards of the average, physically "normal" person and can

realize how much of their own health and bodily activity is the same as that of the average person.

Because of their limited experience or sheltered environment, some physically disabled students need special understanding about how and why regular health habits apply to them.

In addition, physically disabled students need to learn the practicalities of dealing with special health problems related to or resulting from their disability. As a matter of fact they need to learn what their disability is, and to know how to maintain or improve their health status.

Since time is a crucial factor in the learning of additional special concepts and information, the health project team concluded that disabled students need more time for health education. The recommendation is for six half-year programs in junior-senior high school on a 3-year cycle of topics, 3 for junior high and 3 for senior high.

In each of the elementary grades, integration with other subjects is recommended on a three-times-a-week basis.

PREVENTIVE HEALTH EDUCATION

Preventive care becomes an extremely important aspect of health education for the physically disabled since there has usually been an emphasis on corrective treatments for their disability. A new focus is needed in their own orientation toward health care so that they will expend the additional time and effort on general medical check-ups and routine immunizations and maintain a good health status by nutritious diet, prophylactic dental care, and suitable exercise. With the additional coping problems imposed by their disability, preventive mental health education must take a high priority, for the disabled, and can also be a basis for prevention of drug and alcohol abuse.

Safety education should also focus on the prevention of accidents, especially in the light of the additional hazards which the environment poses to the disabled, and the serious consequences of injury from an accident.

After working with the students and their families and trying to decide what information to give the children about their disabilities, a major conclusion has been that hope is a beneficial, realistic aspect of the education of the disabled. The advice given to teachers and parents is this: Don't take away hope. Hope gives a person the will to try and the courage to help himself, to become more independent, to plan for tomorrow. The effort exerted when a person tries to help himself is physically beneficial to his circulation, breathing, bone growth, and appetite. The mental stimulation involved in planning, learning, and working for tomorrow is psychologically beneficial. It helps him to put pain or discomfort into perspective, not to concentrate exclusively on it. He now has other worthwhile, interesting thoughts to occupy his mind.

There are some realistic reasons for encouraging hope. Antibiotics enable people to overcome infections and respiratory complications that used to cause death. Researchers are getting closer to cures for many serious illnesses. They are also finding ways to avoid or overcome birth defects. So, in fact, there is hope for a better future for most disabled young people.

So in educating young people about their disabilities it is important to teach the hopeful aspects. Emphasizing the painful or terminal outlook attached to some diseases does not encourage people to live today to the fullest.

Decisions on teaching about disabilities:

The dichotomy between the right to know and the right not to know has caused serious thought on decisions made by the health team.

We started with the premise that students have a right to know all about their disability. Since the information is contained mostly in medical journals or texts written in verr technical language, there is a barrier to individualized research done by students. Pamphlets put out by related organizations, although written in more easily understandable language, often place emphasis on the disheartening, deteriorative or terminal aspects of the disability.

Information in understandable, yet objectively factual terms would have to be given to the students by the members of the health team either verbally, or by using and explaining selected audio-visual aides like film-loops, transparencies, or filmstrips, or by teacher-made devices or materials.

The decision to actively promote research by and share information with a disabled child had to be an individual one for each student. All children were given a summary of basic information. But the quantity and depth of additional information and advice was dependent on factors such as individual maturity, emotional stability, interest and obvious wish to know.

Observations on implementing the program:

Progressive terminal disease like Muscular Dystrophy present the most difficult decisions. There is sometimes a question about whether the burden of knowing that death is inexorably approaching within a few years may cause a depression which prevents the young person from enjoying the years which he has. Some parents, particularly those of students having Duchenne Muscular Dystrophy, do not wish their children to know that their future is progressively hopeless. Adults dealing with terminally ill young people find it almost impossible to indicate that they know the future is death.

We have found that the older students who are already aware of the usual inevitable outcome prefer to hear and talk about the progress made in scientific research and express great hope that a cure will be found before they die.

Diseases in which the condition in many older students is improved, such as

in Osteogenesis Imperfecta and Dysautonomia, are sources of great encouragement to the younger children and to their parents.

In some disabilities, like those caused by traumatic injuries, knowledge and acceptance is necessary for the establishment of real motivation for independence in the activities of daily living and learning.

In each case where a decision was made to impart information in depth, an accurate explanation of the disability and a discussion of the future was given by the school physician who has an excellent rapport with the students in addition to many years' experience in advising physically disabled children.

DEFINITIONS OF DISABILITIES

DYSAUTONOMIA – Genetic condition found in Jewish children of Eastern European extraction. Affects the function of the autonomic (involuntary) nervous system. Skeletal involvement, such as scoliosis, *often occurs.*

SPINA BIFIDA – Congenital (existing from birth). Defect in the vertebral column characterized by the presence of a myelomenigocele (protrusion of the spinal cord and membrane covering it) both of which should normally be covered by vertebrae. Below the level of the defect, the child has diminished sensation of lower extremities, varying degrees of paralysis, and is incontinent of bowel and bladder.

POST-POLIOMYELITIS – Poliomyelitis is an infectious disease affecting the motor cells in the spinal cord resulting in weakness or paralysis. There may be subsequent atrophy of groups of muscles, ending in contraction and permanent deformity.

QUADRIPLEGIA – Paralysis affecting all four extremities.

PARAPLEGIA – Paralysis of lower portion of body – below waist. May be traumatic, infectious, or congenital.

HEMIPLEGIA – Paralysis on one half of the body – one leg and arm on one side.

SPASTIC PARALEGIA – Spastic paralysis occuring in early childhood. May be traumatic, infectious or congenital. May involve cerebral hemorrhage before birth, or abnormal, involuntary movements of the muscles.

DYSTONIA – Musculorum Deformans – Chronic motor disorder. May be hereditary. Marked by abnormal movements of the muscles.

ATAXIA – Generalized term – usually involves poor coordination, lack of dexterity, unsteady gait, and slow speech. May be congenital or acquired.

FRIEDRICH'S ATAXIA – Progressive paralysis of lower limbs, ataxia and speech impairment.

LEGG-CALVE-PERTHES DISEASE – A disease of the head of the thigh bone which causes a degeneration and necrosis. This is followed by regeneration or recalification. (hip area). Most often affecting boys between four and eleven years of age.

CEREBRAL PALSY – The most common terminology used for children whose symptoms are similar to those with Ataxia. However, there is also a disorder in movement, posture, and coordination related to non-progressive damage to the brain.

MUSCULAR DYSTROPHY – Hereditary disorder transmitted by females but affecting mostly males. Progressive generalized weakness of the voluntary muscles. Non-contagious, chronic wasting which leads to increasing infirmity, and ultimately death.

AMYOTONIA CONGENITA (Oppenheim's Disease) – Born with generalized poor muscle tone. "Floppy" With or without muscle weakness. A descriptive term for many conditions. (Spinal Atrophy)

KUGELBERG-WELANDER DISEASE – A Neuro-muscular disorder. Weakness and atrophy (wasting) of muscles; slowly progressive.

CHARCOT-MARIE-TOOTH DISEASE – Peroneal muscular atrophy. Hereditary neuro-muscular disorder. Slowly progressive muscle atrophy and weakness, starting in the legs.

ARTHROGRYPOSIS MULTIPLEX CONGENITA – A congenital, non-progressive condition in which the tissues at some or all the joints are stiff and fibrous holding the limbs rigid in flexed or extended positions. The joint malformations result from immobilization of the developing embryo from any of a variety of causes which prevent normal spontaneous movements.

RHEUMATOID ARTHRITIS – Disease in which inflamed joints are often accompanied by pain, swelling, and limitations in joint movement and weakness of muscles.

CONGENITAL AMPUTEE – Children who are born with total or partial absence of a limb (Also called reduction deformity)

LIMB DEFORMITIES – Distortion or disfigurement of a limb.

OSTEOGENESIS IMPERFECTA – This condition, also known as "Brittle Bones", is an inherited disorder of development in the skeleton in which the calcium content is far below normal. The bones are excessively thin and subject to multiple fractures following even mild trauma. Children are usually smaller in stature because fractures often occur in the long bones of lower extremities. Congenita: born with abnormalities and often many fractures. Tarde: Condition often not seen until the child starts to walk. Then fractures occur.

ACHONDROPLASIA – Congenital, frequently hereditary disorder in the conversion of cartilage to bone. Because of this, the growing ends, or epiphyses, of the long bones of the limbs, are affected, and inadequate growth results in a type of dwarfism. Short extremities, but well proportioned body. Lordosis (curvature of spine) often occurs, too.

CONGENITAL CARDIAC CONDITIONS – Born with a defect of the heart. This may involve a defect of the valves or it may involve the great vessels. Some of these can be corrected by surgical procedures.

RHEUMATIC HEART DISEASE – Injures the endocardium, the valve, or the muscle fibers. The valves may lose their original efficiency, so that passage of blood is hindered.

HEMOPHILIA – Hereditary disorder transmitted by females but usually affecting only males. An abnormality in blood coagulation resulting in prolonged coagulation time and lowered prothrombin (clotting factor II) consumption.

THALASSEMIA – Hereditary; genetically determined, chronic anemia, causing poor bone growth, fatigability, nose bleeds, and low grade fever.

SICKLE CELL DISEASE – A hereditary, genetic condition of the blood which affects the red blood cells causing them to be malformed like a sickle. Occurs most often in blacks. Characterized by arthralgia, acute attacks of abdominal pain, and ulcerations of the lower extremities.

DESCRIPTIONS AND SAFETY CONSIDERATIONS FOR THE DISABILITIES

SUMMARY OF INFORMATION ABOUT DYSAUTONOMIA (1)

For the general understanding of teachers or aides who might be working with a student with this disability, we have compiled a general summary from the records of the students at Human Resources School. This information represents a variety of findings, since each student has his own physician and may have attended different hospitals or rehabilitation centers.

Therefore, two important points must be noted. One is that each child is different, and so is the severity of his disability. The other is that medical procedures and recommendations are constantly advancing and changing, and these findings represent only a summary of the past.

Dysautonomia – Genetic condition found in Jewish children of Eastern European extraction. Effects function of autonomic (involuntary) nervous system. Skeletal involvement, such as scoliosis, often occurs.

SYMPTOMS:

Lack of tears

Insensitivity to pain

Vomiting

Blotching of skin

Unstable temperature – fluctuations unrelated to infections

Unstable blood pressure

Emotional instability

Delayed development (Riley-Day Syndrome: late motor development, floppy appearance, tendency to vomit, some degree of pseudo-retardation due to lack of experience and exposure early in life)

HOSPITALIZATIONS AND TREATMENTS:

Nerve biopsies (nerves have areas without normal bundles)

Eyes: histamine and mecalin

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY DOCTORS:

PROBLEMS:

Corneal ulcers

Gastro-intestinal problems

Bladder problems – incontinence of urine

Skeletal system: scoliosis, deformities of long bones, embarrassment of respiratory system

Tendency to become fatigued easily because of weaker muscles, diminished respiratory function, lower endurance

Sleep often interrupted by URI or vomiting

Short life expectancy – death possible from aspiration, cardiac or respiratory failure, high fever, fluctuating blood pressure

RECOMMENDATIONS:

Therapy: derotation exercises for scoliosis, ROM and active assistive exercises, breathing exercises

Back brace if scoliosis is severe

Artificial tears to be administered several times daily

Quiet firmness on the part of teachers and others in authority; need for defined controls and limits

SUMMARY OF INFORMATION ABOUT SPINA BIFIDA MANIFESTA (2)

For the general understanding of teachers or aides who might be working with a student with this disability, we have compiled a general summary from the records of the students at Human Resources School. This information represents a variety of findings, since each student has his own physician and may have attended different hospitals or rehabilitation centers.

Therefore, two important points must be noted. One is that each child is different, and so is the severity of his disability. The other is that medical procedures and recommendations are constantly advancing and changing, and these findings represent only a summary of the past.

Spina Bifida Manifesta – Congenital (existing from birth). Defect in the vertebral column characterized by the presence of a myelomeningocele (protrusion of the spinal cord and membranes covering it) both of which should normally be covered by vertebrae. Below the level of the defect, the child has diminished sensation of lower extremities, varying degrees of paralysis, and is incontinent of bowel and bladder.

SYMPTOMS:

Myelomeningocele present at birth

Sensory loss and motor loss

Bowel and bladder incontinence

Hydrocephalus (enlargement of the head caused by improper circulation and absorption of cerebrospinal fluid) may develop any time after birth.

HOSPITALIZATIONS AND TREATMENTS NOTED IN RECORDS:

Closure of myelomeningocele shortly after birth

Shunt procedure to redirect cerebrospinal fluid into the heart, where it can circulate with the blood and reduce the possibility of hydrocephalus.

Periodic shunt revisions later in life

Periodic urological check-ups

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY DOCTORS:

PROBLEMS:

Occasional tenderness at area of myelomeningocele closure

Development of decubitus ulcers on buttocks

Pressure sores from braces

Development of lower extremity deformities

Urinary tract infections

RECOMMENDATIONS:

Therapy: ROM, PRE for uppers, ambulation training with appliances, swimming

Brace changes

Surgical procedures to allow ambulation without braces

Treatment of decubitus ulcers

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY PARENTS:

Change in behavior after shunt revisions

Embarrassment at bowel and bladder incontinence

Embarrassment at wearing orthopedic shoes (noted by teacher)

SUMMARY OF INFORMATION ABOUT MUSCULAR DYSTROPHY (3)

For the general understanding of teachers or aides who might be working with a student with this disability, we have compiled a general summary from the records of the students at Human Resources School. This information represents a variety of findings, since each student has his own physician and may have attended different hospitals or rehabilitation centers.

Therefore, two important points must be noted. One is that each child is different, and so is the severity of his disability. The other is that medical procedures and recommendations are constantly advancing and changing, and these findings represent only a summary of the past.

Duchenne Muscular Dystrophy – Hereditary disorder transmitted by females but affecting mostly males. Progressive generalized weakness of the voluntary muscles. Non-contagious, chronic wasting which leads to increasing infirmity, and ultimately death.

MEDICAL LISTING OF EIGHT STAGES OF FUNCTIONAL ABILITY

1. Ambulates with waddling gait and marked lordosis. Elevation activities adequate (climbs stairs and curbs without assistance).
2. Ambulates with waddling gait and marked lordosis. Elevation activities deficient (needs support for curbs and stairs).
3. Ambulates with waddling gait and marked lordosis. Cannot negotiate curbs or stairs, but can achieve erect posture from standard height chair.
4. Ambulates with waddling gait and marked lordosis. Unable to rise from a standard chair.
5. Wheelchair-independence: Good posture in the chair, can perform all activities of daily living from wheelchair.
6. Wheelchair-dependence: Can roll chair, but needs assistance in bed and wheelchair activities.
7. Wheelchair-dependence-and back support: Can roll the chair only a short distance, needs back support for good wheelchair position.
8. Bed Patient: Can do no activities of daily living without maximum assistance.

SUMMARY OF FINDINGS FROM SCHOOL RECORDS

For the general understanding of teachers or aides who might be working with a student with Muscular Dystrophy we have summarized the findings of the records of our 34 students who have Muscular Dystrophy.

EARLY STAGES–

SYMPTOMS–

Ambulates with moderate amounts of waddling and lordosis (bending backwards) with a heel-toe pattern

Ability to walk on toes but not on heels

Need to use rail or have assistance in going up stairs or climbing a curb

Complete independence in all activities of daily living

Deep tendon reflexes absent except for Achilles jerk

Normal range of motion except for tight heel cords

Bilateral hypertrophy of the calf

Tendency to fall frequently

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY DOCTORS

Encouragement to ambulate as much and as long as possible to prevent progression of deformities

Therapy–Active assistive exercies for upper extremities, exercises for trunk musculature, ROM (Range of Motion) of hips, knees, and ankles. All to prevent later deformities and to help maintain present level of function.

Lengthening of the heel cord and transplanting of tibial dorsum to allow ambulation for a longer period of time. (Can ambulate with braces or cast one week following surgery.)

MIDDLE STAGES–

SYMPTOMS–

Increased tendency to fall and inability to get up after falling

Final confinement to a wheelchair and dependence for activities of daily living except for feeding self and writing

Development of flexion contractures of both hips and knees and equinovarus deformity of ankles.

Severely limited range of motion in heel cord

Development of scoliosis (curvature of the spine)

Absence of deep tendon reflexes except for achilles jerk

Tendency to obesity

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY DOCTORS–

Continuation of therapy to maintain level of function and prevent further deformities

Sometimes braces to prevent deformities

Wheelchair when ambulation is no longer possible

Diet to control obesity

Disruptive behavior in school sometimes noted by parents and teachers

LATER STAGES–

SYMPTOMS–

Complete dependence in all activities of daily living

Inability to feed self or write as musculature of wrists and hands decreases

Round facial appearance with involvement of muscles of mastication (chewing)

Complete absence of deep tendon reflexes

Progression of hip, knee and ankle deformities

Tendency to obesity

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY DOCTORS–

Appliance to aid in writing and feeding self

Plastic sitting corset to prevent progression of scoliosis

Electric wheelchair

Diet to control obesity

Comfort aids, particularly specially made cushions to prevent pressure sores on buttocks

HOSPITALIZATIONS NOTED IN RECORDS–

Sometimes surgery for lengthening of heel cord (early stages)

Respiratory infections (later stages)

MEDICAL TREATMENTS NOTED IN RECORDS–

Surgical lengthening of the heel cord and transplanting of the tibial dorsum to allow ambulation for a longer period of time

Inhalation therapy

TESTS NOTED IN RECORDS–

Muscle biopsy, enzyme studies, etc. to determine carrier

Blood tests of parents to determine if disability is result of mutation or sex-linked characteristic

SUMMARY OF INFORMATION ABOUT ARTHROGRYPOSIS MULTIPLEX CONGENITA (4)

For the general understanding of teachers or aides who might be working with a student with this disability, we have compiled a general summary from the records of the students at Human Resources School. This information represents a variety of findings, since each student has his own physician and may have attended different hospitals or rehabilitation centers.

Therefore, two important points must be noted. One is that each child is different, and so is the severity of his disability. The other is that medical procedures and recommendations are constantly advancing and changing, and these findings represent only a summary of the past.

Arthrogryposis Multiplex Congenita – A congenital, non-progressive, condition in which the tissues at some or all the joints are stiff and fibrous, holding the limbs rigid in flexed or extended positions. The joint malformations result from immobilization of the developing embryo from any of a variety of causes which prevent normal spontaneous movements.

SYMPTOMS:

Underdeveloped due to basic disability; generalized underdevelopment of muscles and resultant muscle weakness

Absence of deep tendon reflexes

From birth – Flexion deformities of the hips, knees, wrists, toes; deformities of feet; dislocated hips

HOSPITALIZATIONS AND TREATMENTS:

Surgery to correct flexion deformities

Heel cord lengthenings and tissue releases

Bone fusions

Casting of hand to improve function (done when young)

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY DOCTORS:

PROBLEMS:

Development of scoliosis

Frequent abdominal complaints due to ulcers or ulcerated colitis (young adults)

Little functional use of hands – need for assistance in ADL's

RECOMMENDATIONS:

Braces – standing and ambulation with appliances if possible

Sitting corset for scoliosis (to prevent further progression)

Orthopedic devices for feeding and writing

No contra-indication for swimming

Therapy: Range of motion for all joints; active assistive exercises for uppers

Wheelchair for distance if necessary

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY PARENTS:

Assistance for ADL's

Daily therapy at home

Sitting corset difficult to handle

Pressure sores from braces

Rheumatoid Arthritis – Disease in which inflamed joints are often accompanied by pain, swelling, and limitations in joint movement and weakness of muscles.

SYMPTOMS

EARLY STAGES

Fatigue, muscular stiffness, loss of appetite and weight, cold hands and feet, swelling of joints, nodules on skin.

LATER STAGES

Loss of joint motion resulting in flexion deformities and limitation in range of movement.

HOSPITALIZATIONS AND TREATMENTS

PHYSICAL THERAPY – ROM, active assistive exercises, progressive resistive exercises

Possible splinting of hands or other surgical measures

DRUGS – Aspirin, steroids (group of drugs related to cortisone which may be discontinued because of undesirable side effects), gold salts, and antimalarials (may bring about remissions after several months of treatment).

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY DOCTORS:

PROBLEMS:

Limitation in ADL, even restricting feeding and writing in some cases

RECOMMENDATIONS:

Diet, posture, avoidance of colds and dampness

No contra-indication for swimming

SUMMARY OF INFORMATION ABOUT CONGENITAL AMPUTEES (5)

For the general understanding of teachers or aides who might be working with a student with this disability, we have compiled a general summary from the records of the students at Human Resources School. This information represents a variety of findings, since each student has his own physician and may have attended different hospitals or rehabilitation centers.

Therefore, two important points must be noted. One is that each child is different, and so is the severity of his disability. The other is that medical procedures and recommendations are constantly advancing and changing, and these findings represent only a summary of the past.

Congenital Amputee – Children who are born with total or partial absence of a limb. (Also called reduction deformity).

HOSPITALIZATIONS AND TREATMENTS:

Depending on extent of deformity, prosthetic limbs are fitted.

Sometimes a surgical procedure may be done to facilitate fitting of a prosthetic.

As the child grows, new fittings are necessary so there is a possibility of repeated hospitalizations throughout their lives.

SPECIAL PROBLEMS AND RECOMMENDATIONS MADE BY DOCTORS:

Make sure area of limb that fits into prosthesis is protected from skin breakdown.

When prosthesis gets too small rubbing can cause skin irritation.

Use these prostheses.

SUMMARY OF INFORMATION ABOUT OSTEOGENESIS IMPERFECTA (6)

For the general understanding of teachers or aides who might be working with a student with this disability, we have compiled a general summary from the records of the students at Human Resources School. This information represents a variety of findings, since each student has his own physician and may have attended different hospitals or rehabilitation centers.

Therefore, two important points must be noted. One is that each child is different, and so is the severity of his disability. The other is that medical procedures and recommendations are constantly advancing and changing, and these findings represent only a summary of the past.

Osteogenesis Imperfecta – This condition, also known as "Brittle Bones", is an inherited disorder of development in the skeleton in which the calcium content is far below normal. The bones are excessively thin and subject to multiple fractures following even mild trauma. Children are usually smaller in stature because fractures often occur in the long bones of the lower extremities

Congenita: born with abnormalities and often many fractures.

Tarde: condition often not seen until the child starts to walk. Then fractures occur.

SUMMARY OF FINDINGS FROM SCHOOL RECORDS:

For the general understanding of teachers or aides who might be working with a student with Osteogenesis Imperfecta, we have summarized the findings of the records of our 14 students who have Osteogenesis Imperfecta.

SYMPTOMS:

Eyes – Blue Sclera

Teeth translucent with pearl-like appearance

Healed fractures, primarily of lower extremities

Bowing of long bones (Shepherd's Crook)

Short structure – disproportion between trunk and extremities due to frequent fractures

Megacephaly only apparent because of trunk size as seen in proportion to extremities

Generally underdeveloped physical appearance

Infantile behavior due to protection necessitated by brittle bones – infantile behavior in young children.

HOSPITALIZATIONS:

Fractures – some set in doctor's office; others requiring surgery

Rodding of femur and tibia to aid in the prevention of further fractures (some cases)

MEDICAL TREATMENTS NOTED IN RECORDS:

Calcitonin – Some cases

Therapy (various depending on each child)

A. Swimming
B. Ambulation training if possible
C. Exercise for ROM, muscle strength, etc.

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY DOCTORS:

Limitations set on Physical Education Activities

Fear of doctors and examinations

Immaturity and infantile behavior

Recommendations for therapy, rodding procedures, change in appliances or wheelchairs

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY PARENTS:

Fear of doctors

Fear of falling

Fear of fractures

Discomfor while in SPICA

Fear of being handled by people other than parents

SUMMARY OF INFORMATION ABOUT ACHONDROPLASIA (7)

For the general understanding of teachers or aides who might be working with a student with this disability, we have compiled a general summary from the records of the students at Human Resources School. This information represents a variety of findings, since each student has his own physician and may have attended different hospitals or rehabilitation centers.

Therefore, two important points must be noted. One is that each child is different, and so is the severity of his disability. The other is that medical procedures and recommendations are constantly advancing and changing, and these findings represent only a summary of the past.

Achondroplasia – A congenital disorder due to the conversion of cartilage to bone (frequently hereditary). Because of this, the growing ends or epiphyses, of the long bones of the limbs, are affected, and inadequate growth results in a type of dwarfism. Short well-porportioned body. Lordosis (curvature of the spine) often occurs, too.

SYMPTOMS:

Small size

Average achondroplastic attains a height of 50". Head is apt to be enlarged, although it appears relatively larger than it is because of small body size. Often bowing appearance to the legs.

Life expectancy is fairly normal.

HOSPITALIZATIONS AND TREATMENTS:

As they develop into middle life complications might possibly develop from their lordosis (abnormal curvature of the spine).

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY DOCTORS:

Biggest problem is adapting to a world of "normal" size people and being able to function in a world made for "normal" size people. This affects schooling, socialization, and employment opportunities.

SUMMARY OF INFORMATION ABOUT CONGENITAL CARDIAC CONDITIONS (8)

For the general understanding of teachers or aides who might be working with a student with this disability, we have compiled a general summary from the records of the students at Human Resources School. This information represents a variety of findings, since each student has his own physician and may have attended different hospitals or rehabilitation centers.

Therefore, two important points must be noted. One is that each child is different, and so is the severity of his disability. The other is that medical procedures and recommendations are constantly advancing and changing, and these findings represent only a summary of the past.

Congenital Cardiac Conditions – born with a defect of the heart. This may involve a defect of the valves or it may involve the great vessels. Some of these can be corrected by surgical procedures.

SYMPTOMS:

In some heart conditions children have cyanotic or bluish coloring to lips and nail beds, caused by lack of oxygen in blood stream.

Shortness of breath following a period of exertion

Generally smaller in stature

HOSPITALIZATIONS AND TREATMENTS:

Correction of defect

Treatment of complications of defect

Treatment of severe respiratory infection which might cause difficulty in breathing.

Often hospitalized for procedure to improve condition of blood.

Examinations of the heart (eg., catheterizations) to define exact area of defect.

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY DOCTORS:

More susceptible, probably to upper respiratory infections because of the way the body is affected by poor circulation and because of connection between heart and lungs.

Enlarged heart is common, because heart has to work twice as hard to accomplish its work.

Insufficiency of oxygen to brain may cause learning problems.

Problems related to circulation.

Extremes of temperature lower body resistance to infection. Therefore, air-conditioned building is better because temperature is more even.

May need to be more careful about overdoing.

Children with congenital heart disease are usually self-limiting in what they are able to do. This separates them from those who have an acquired heart disease and must be made to slow down and rest.

SUMMARY OF INFORMATION ABOUT HEMOPHILIA (9)

For the general understanding of teachers or aides who might be working with a student with this disability, we have compiled a general summary from the records of the students at Human Resources School. This information represents a variety of findings, since each student has his own physician and may have attended different hospitals or rehabilitation centers.

Therefore, two important points must be noted. One is that each child is different, and so is the severity of his disability. The other is that medical procedures and recommendations are constantly advancing and changing, and these findings represent only a summary of the past.

Hemophilia – Hereditary disorder transmitted by females but usually affecting only males. An abnormality in blood coagulation resulting in prolonged coagulation time and lowered prothrombin (clotting factor II) consumption.

SYMPTOMS:

Hemorrhage occurring either spontaneously or after trauma (injury)

Joint swelling

Ecchymotic areas of skin (discolored areas where blood has escaped into the tissue)

HOSPITALIZATIONS AND TREATMENTS:

Blood transfusions

Local hemostatis (arresting of escaping blood by means of compression or tying off blood vessels with ligature)

Administration of antihemophiliac globulin and albumin (plasma proteins).

SPECIAL PROBLEMS NOTED AND RECOMMENDATIONS MADE BY DOCTORS:

Avoidance of any trauma; precautions as far as activities are concerned.

Swimming only after consultation with physician and swimming instructor.

Physical Therapy (ROM) in some cases, but prohibited in others because of resulting hemoarthrosis.

ACTIVITIES AT HUMAN RESOURCES SCHOOL RELATED TO PHYSICAL HEALTH

Science and health education were integrated for the development and application of the physical health strands for all students. Included in this development were the science teacher, the school nurse-teacher, the physician, and the classroom teachers. This team also met with the project director and a research associate for weekly planning and coordination sessions.

The school integrated a number of its curricular and co-curricular activities with those of the health curriculum, resulting in the following projects:

For each section of Strand I, physical health, a particular application to disabled children was tried. Some indicative examples follow:

I. **Individual Health Status:** Disabled students require help to live as total individuals in spite of their disabilities. To do this they need assistance in living with their problems and correctly assessing their physical abilities. Optimum fitness despite the limitations of each student was the aim.

A. Daily Health Practices:

Daily health practices have special significance for maintaining the overall fitness and well-being of a disabled student. Students were motivated to accept responsibility for these practices and to find ways of caring for themselves.

Teachers developed sensitivity to the importance of these practices to students with disabilities. Their observations are incorporated into the background pages of the curriculum guide where the teacher is informed of the special needs of the children with each type of disability. The significance of each of the following daily health practices for maintaining fitness is explained: bathing daily, washing hands and face frequently, eating nourishing meals, care of skin, care of feet, care of hair, care of nails, care of teeth, good posture: moving, standing, or walking.

Students worked out methods of managing their health practices by posing for photographs demonstrating the rules of good health practices. These photographs were used as an exhibit at the health-science fair.

B. Long-term Health Practices:

Emphasis was placed on long-term health practices such as getting periodic general medical check-ups, maintaining resistance to infection, and participating in beneficial physical activities.

A campaign was launched to encourage students to have periodic medical check-ups, in addition to disability-related treatments. Continual reminders to parents included letters from the school nurse-teacher with follow-up discussions at small group parent meetings, distribution of pamphlets, and exhibits at the health-science fair. As a result there was a 25% improvement in numbers of children getting regular medical check-ups and routine immunizations and in reporting the information to the school.

Planning individualized programs of personal exercises and activities to be enjoyed in adult life was undertaken. A swimming pool program was used extensively to encourage movement of even the weakest students – for perceptual experiences and for circulation, bone growth, kidney function, and muscle strength.

The most successful methods of motivating children to participate in beneficial movement and exercise was through games, competitive sports, tournaments, and self-improvement check-lists using adapted equipment and minor rule changes.

Coordination with ETV – Weekly lessons in elementary grades coordinated with the ETV health-science series "All About You." The program in human anatomy and physiology emphasized the functions of the mind and body, helped chilren understand what a human being is and examined reasons for good health care. Students and teachers followed up by applying the lesson to the individual needs of the students.

Individual students were encouraged to develop health habits based on their special needs. For example: Meeting and discussion with the nurse and the students with Spina Bifida to emphasize the importance of cleaning and emptying urinary collecting devices, methods of regular emptying of the bladder by credéing, proper cleansing procedures to eliminate odor, regulation of bowel.

C. Acceptance of Individuality of Each Person's Physical Appearance:
Study of the varieties of growth patterns and physical differences through library books, filmstrips, and personal observations.

Height and weight measurements were taken for each student. For height: using a tape measure while student is lying down. For weight: Using a scale in which students can sit. Purpose: understanding that their fitness does not depend on conformity to standard growth charts.

Guest alumni led "rap" sessions emphasizing relative importance of developing social maturity, personality, and qualities of character as balanced against physical beauty.

Student council and recreation program leaders led workshops on the importance of personal cleanliness, good health habits, good grooming and good manners for social acceptance.

D. Dispelling of Misunderstanding about Disabilities:
Some students, after preparatory research as well as consultation with the nurse, explained their disability to the other students. Some had expressed the feeling that classmates avoided contact with them because they thought they might catch a particular disability.

A clear explanation by the physician of the difference between communicable and non-communicable diseases was given so that students would understand that their disabilities were all non-communicable.

Explanation of the etiology of the major disabilities by the school physician dispelled many misunderstandings. The explanations included:

Hereditary diseases (like Hemophilia, Muscular Dystrophy, Dys-autonomia)

Birth Defects caused by: Trauma in utero
Disease of mother while pregnant (e.g. Rubella)
Unknown etiology – but still non-communicable

Accidental trauma

E. Improved Attitudes Toward Disabilities:
Most students did not know what disabilities their classmates had and

many were afraid that the other disabilities were catching. Once a few students explained their disabilities to their classmates, many others became interested in doing research on their own disability. Increased information and knowledge for those who wanted it had a positive effect on all the students.

Since all our students could see the improved prospect for their future by observing the optimism and independence of the older students with similar disabilities, the open-communication approach had a very positive effect.

Only muscular dystrophy was a problem. In students with progressive muscular dystrophy the deteriorative effects on the older boys is apparent. In addition, their parents worried about the effect of their knowing about the probable outcome. We found, however, that the older students, all of whom can read intelligently, surmised or knew. They also saw that two seniors with muscular dystrophy had died that year.

The students with Muscular Dystrophy were helped by learning about the advances in research on muscular dystrophy, and about the advances in avoidance of complications by the use of antibiotics, etc. When they understood that good care prolonged life, they felt better able to cooperate in the effort to do as much as they could for themselves and to accept all important medical recommendations for their maintenance while they hoped for a breakthrough in the discovery of a cure.

They also expressed their feelings that they found satisfaction from life because of the love given to them, and because their intellectual and social needs were being fulfilled. All expressed hope for a cure.

2. Nutrition:
Appropriate diet was a special priority goal for all disabled children. Weight control for wheelchair-bound students is vital in order to avoid sores, to be able to be lifted by others, or to be able to maneuver themselves into and out of the wheelchairs. Because of being wheelchair-dependent, they have a special problem with obesity. Therefore, weight control was approached from this point of view.

In some cases, duller taste sensations, such as those which occur in

children with dysautonomia, may interfere with proper nutrition. In other cases, students who cannot swallow food received training in selecting and using special foods and in adjusting to a wider variety of nutritional foods.

A. Health Breakfasts as Parent Education:
Parents of the students have been encouraged to become involved in the nutritional education of their children by inviting them to a series of health breakfasts which are described in the nutrition module.

The health breakfasts, held during school hours, brought out the largest number of parents of any event ever held at Human Resources School. Comments were overwhelmingly favorable.

B. Food Intake Records Kept:
Parents were involved in helping their children keep a complete record of all food and drink eaten for one week. Then they evaluated their diets in individual consultations with the school nurse-teacher and discussed what they should add or subtract according to their own needs.

C. Secondary Nutrition Project:
Secondary students in coordination with the home economics classes had a program to develop independence in shopping for, cooking, serving, and eating nutritious meals without relying on "fast foods" or fattening snacks.

To prepare to live independently they received practice and training in planning nutritious menus based on the four food groups, coping with the logistics of shopping in a supermarket, preparing and cooking a variety of foods, finding socially recommended methods of serving and eating the meal, and managing the clean-up afterwards. As a culminating activity they bought, cooked, and ate a class luncheon.

The senior high school students voted this as one of the most practical and enjoyable programs this term.

D. Healthful Snack Campaign:
A list of healthful snacks was developed by the students and the health project committee. The list was sent home with a letter enlisting their parents' cooperation. The teachers and the nurse continued to encourage students at snack time each day. Classes had "healthful snack" parties.

After that, all special parties and luncheons in the school emphasized foods from the healthful snack list.

3. Sensory Perception:

A. Coping with Loss of Sensory Perception:
Children with paraplegia due to spinal cord injuries or spina bifida may have loss of sensation below the level of their lesion. They often have bladder and bowel incontinence and muscle weakness. Since they do not feel pain, they need to be trained to examine their buttocks for skin breakdown from sitting, from rubbing on braces, or from urinary irritation.

B. Remediating Perceptually Based Learning Disabilities:
A special sensory perception area has been enlarged and a special teacher has been working with individual students to correct perceptually based learning disabilities using diagnosis of learning strengths to remediate learning weaknesses. Exercises were individually prepared on the basis of Meeker's Structure of Intellect using diagnosis of learning strengths to remediate learning weaknesses.

The Frostig Perceptual Program was individualized for first graders.

C. Overcoming Body Image and Spatial Relationship Problems:
In addition to the many physical activities suggested in the module, center-wide cooperation in activities aimed at improving students' self-concept also resulted in improved body-image and more accurate perception of spatial relationships.

D. Improving Ability to Use and Enjoy the Senses:
Many classroom and outdoor activities were used in the school to attempt to compensate for the students' sensory deprivation due to physical confinement. In addition, aiming to provide opportunities in sensory experiences which physically disabled children are often deprived of, we have introduced programs in a Planetarium and 360° Multi-Sensory Experience Room. In the 360° theater the students had the experience of being "in" places like the Bethpage Restoration Village using peripheral vision and of exploring the wetlands of Long Island (which would be physically impossible in a wheelchair).

4. **Dental Health:** With the physically handicapped child, neuro-motor and muscular-skeletal deficits increase the probability of dental problems such as caries and malocclusions. Therefore, these children require an intensive program in oral hygiene as well as close supervision of dental health status by a dentist.

   Extension of services of dentist and dental hygienist, experimentation with special types of toothbrushes and water piks, and devices for enabling children with upper extremity weakness to grip regular brushes were carried out.

   In coordination with service in our dental clinic, dentists have visited each class and conducted lessons in oral hygiene, answered students' questions, consulted on individual disability-related problems of maintaining dental health.

   Since a campaign to have students brush after lunch was not entirely successful in the elementary grades, a more practical campaign was mounted to have every student rinse his mouth at lunch time. This approach succeeded.

5. **Disease Prevention and Control:**

   It is important to emphasize the need for routine immunization for physically disabled children since they are more prone to complications of disease. Further, a physical therapy program is also a means of preventing disease or infection for children with respiratory infections. This is particularly important for children with muscular dystrophy, scoliosis, dysautonomia and myopathies.

   Because of their dependency, personal hygiene is often neglected in severely physically disabled children. Emphasis was, therefore, placed on health habits, self-care, and on training parents and guardians to help immobilized children.

   A campaign to encourage regular check-ups and preventive inoculations which may be neglected because of concentrations on the disability resulted in closer home and school communication and almost total improvement in student immunizations.

   On the secondary level, lessons in the causes and results of venereal disease were given special attention because of the naïvete and protected rearing of many of the students.

   There is a common misunderstanding, even among other disabled people, that children with a chronic disability have a "catching" or contagious disease. The chronic disabling conditions described in this project are not contagious. Most of them are congenital, hereditary, or caused by a traumatic injury.

   Therefore it was important to assure the students that their disabilities were not "catching" so that they could explain this objectively to others who might avoid physical proximity because of a mistaken fear of contagion.

   Training in defining and explaining the difference between physical disability and contagious disease was a significant activity for secondary students.

6. **Culminating Health-Science Fair:**
   Combining the year's health-science learnings into exhibits and projects.

   The activities of the health-science fair emphasized the aspects of physical health which are included in the regular curriculum. Disability-related learnings were not exhibited at the fair. However, the students' capabilities in choosing the activities, preparing the exhibits, and demonstrating the health habits and knowledge which they had learned was an application of their ability to cope successfully with their disabilities in the activities of daily living.

HEALTH-SCIENCE FAIR ACTIVITIES AT HUMAN RESOURCES SCHOOL

KINDERGARTEN – HEALTHFUL SNACKS

1. Good snacks – for good health
   popcorn
   peanutbutter and crackers
   Students pop the corn in an electric popper and spread peanutbutter on crackers.
   Visitors work out calorie content and nutritional value of each snack while enjoying a taste chosen by students and exhibited on a low table

2. Picture-story books – on "Learning About Health"

FIRST GRADE – "GOOD HEALTH RULES THROUGH PICTURES AND DRAWINGS"

1. Blow-ups of photographs of children's health rules with children demonstrating do's and dont's and printed rules underneath each picture. List do and don't rules.

2. Student-made Health Coloring Books on dittoed sheets illustrating the do's and don'ts; crayons to go with books – given out to visiting children.

3. Children's growth records showing comparison from beginning and end of term. (On printed sheets and arranged according to grades and classes to be given out)

4. Scale – children weigh people at fair in pounds and convert their weight to metric (right there).

5. Measuring height.

SECOND GRADE – "GREEN PLANTS – OUR PRIMARY FOOD SOURCE" – NUTRITION

1. Farm display built on a 6' x 4' board. Models of barn, silo, animals, fence and rows of growing plants from seeds planted by students. On one side, pictures of the foods they become.

2. Posters
   1) Parts and function of plant
   2) Seed parts
   3) Seed cycle
   4) Photosynthesis
   5) Phototropism

3. Children's plant growth record and various experiments

4. Platters of vegetable snacks – carrots, celery, beans and signs explaining nutritional value (vitamins, minerals, nutrients, calories).

5. Tadpoles

THIRD GRADE – "BACTERIA – THANK-YOU AND NO THANK-YOU" – DISEASE PREVENTION AND CONTROL

1. Mural – time-line of man's key advances in understanding disease and its control.

2. Posters
   1) Helpful bacteria: soil, cheese, wine, alcohol
   2) Growth of bacteria – 1 bacteria splitting every 15-20 min. multiplies into 66 billion in 12 hours.
   3) Body defense against bacteria: white blood corpuscles, skin, acid in stomach, hairs in nose, fever.
   4) Wonder drugs
   5) Good health rules

3. Student-made electronic game – match scientist with his or her contribution to health.

4. Exhibit – soil bacteria – 3 trays of dead dry leaves – shown at various stages of return to soil.

5. Microscope (parts) – exhibit with various prepared slides – bacteria.

6. Petri dishes – demonstration of bacterial growth from hands dirtied by

rubbing them on wheelchair wheels, from hands which touched desk tops, from washed hands.

7. Children's reports on "Microbe Hunters"

8. Plant growth from "dead matter".

INTERMEDIATE GRADES – DISEASE – PREVENTION AND CONTROL

1. Mural – names of diseases and incubation rates.

2. Video tape program – children's recordings explaining contributions of various "Microbe Hunters".

3. Immunization Schedule Review Station – record of immunization shots given out, to be checked over by parent and child together, verified by parents, and returned by student to school nurse-teacher.

4. Posters
   1) Kinds of bacteria
   2) Definitions of: bacteria, protozoa, virus, contagious disease epidemic, immunization, symptoms, antibodies, communicable disease.
   3) Good health rules.

5. Film Strips – Walt Disney – "How to Catch a Cold" projected by a student.

6. Microslide Viewers – for viewing of disease-causing agents.

INTERMEDIATE GRADES – GOOD NUTRITION VITAL TO GOOD HEALTH

1. Experiment "Yeast Needs Food to Grow"
   a) Set up yeast in three containers – watch yeast growth in corn syrup and water; corn starch and water; sugar and water.
   b) Show dough prepared by kneading the ingredients
   c) Have loaves of bread prebaked by students as samples
   d) Give out recipes
   e) Make metric measurements

2. Experiment – demonstrate Ice Cream Making (1 time) (show science of cold to liquids to solids)
   a) Show ingredients (nutritional and caloric values)
   b) Make a batch of ice cream
   c) Give samples (prepared in advance) and kept in freezer
   d) Distribute recipes in metric measurements.

3. Posters
   a) Good nutrition – 4 basic food groups
   b) Vitamin chart
   c) Calories in food
   d) Origins of food: Student-made booklets on topics done as library research
   e) Calories – calorimeter – Drawing of explanation given in class
   f) Good health rules.

4. Give-aways – Granola cookies given out as sample of food made from all natural ingredients

5. Game – Match food with its calories – Use food models made in art to balance weights representing calories. Prize: granola cookies (sample of natural ingredients food).

INTERMEDIATE GRADES – DENTAL HEALTH

1. Films – ADA film loop cassettes on dental health.

2. Display Tooth Model made by students with labeled parts.

3. Proper tooth brushing – demonstration center – Use brush and mirror.

4. Crocodile posters and cards (to be given out) from ADA, listing dental health rules.

5. Experiment – effect of acid on egg shell (12 eggss – 1 per day removed from vinegar) plus, poster explaining it, to show what could happen to teeth.

6. Game: "Whose Teeth?" Match different kinds of teeth with kinds of

animals. Packets with toothbrush, toothpaste, and disclosure tablets as prizes for game.

7. Dental Chart – students record own fillings and missing teeth on chart showing all the teeth.

8. Posters
   1) Dentition
   2) Tooth decay
   3) Halitosis
   4) Functions and different kinds of teeth
   5) Good health rules

9. Dental health booklets made by students. Given out.

INTERMEDIATE GRADES – SENSORY PERCEPTION – CARE OF EYES AND EARS

1. Electronic display of eye parts: "How the Eye Sees"

2. Game – Tongue Map – match taste with area – e.g., touch cube of sugar to correct area and make it buzz. Prize: Granola cookies.

3. Color tree – Built in art class, demonstrating the color spectrum

4. Color box – To demonstrate the effect of three different light colors on objects in a room.

5. Prism – formation of spectrum

6. Chart: wave-lengths of various colors

7. How eye sees color

8. Color blindness test demonstrated

9. Posters
   1) Optical Illusions
   2) Light: a form of energy
   3) Perception posters

10. Eye test – Ear test – equipment (eye charts and Audiometer supplied and demonstrated by School Nurse-Teacher)

11. Good health rules.

INTERMEDIATE GRADES – OUR PLANETARIUM – ASTRONOMY AND MULTI–EXPERIENCE ACTIVITIES

1. Mural – Constellations

2. Booth – Zodiac tickets for Planetarium Show

3. Electronic Games
   1) Guess the Constellations
   2) Trip through the planets
   3) Matching pattern game

4. Sun Dial Cards – given out – Demonstrating how sun dial works. How altitude of sun is read.

EVALUATION

Ongoing evaluation and revision was done on each module.

The units included in each module are those evaluated by the teachers, students, and parents involved and given a rating of good (3), very good (4), or excellent (5), on the following items:

Relevance in fulfilling assessed needs

Helpfulness in improving students' health knowledge

Productiveness in establishing more positive attitudes

Motivation in developing good health habits

Evaluation of student learning was done by the students themselves by performance of the student self-evaluation activities. These activities gave each student the opportunity to demonstrate what he had learned in an enjoyable, non-competitive way.

The self-evaluation activities included in column three on each page are the ones rated good (3), very good (4), or excellent (5) by those who worked with them.

The project resulted in:

1. Improvements in test scores on standardized tests of knowledge and behavior as summarized in the final report.

2. Improvements in student attitudes as demonstrated by pre-project and post-project questionnaires given to students, parents, and teachers.

3. Development of 5 printed strands of health modules, each individualized according to 9 disability categories.

4. Consolidation of background information on each disability as it relates to each strand of health education. This background information is printed in the modules. Aimed at teachers of disabled students, it represents the combined three-year input and experience of faculty, parents, and students.

Student Acquisition of Both General and Specialized Health Knowledge and Behaviors.

The two most important accomplishments of the health project were:

1. The physically disabled students became aware of their commonality with "normal" students in needing to adopt daily and regular procedures for maintaining and preserving optimum health as well as physical and emotional well-being.

   Their improved awareness of health knowledge and adoption of better health behaviors were demonstrated by improved scores on both the AAHPER Cooperative Health Education Test and the Health Behavior Inventory.

2. The physically disabled students gained specialized knowledge and behaviors such as these:

   a. became aware of the special procedures which could minimize health problems related to their disabilities

   b. learned about sources of help for the disabled

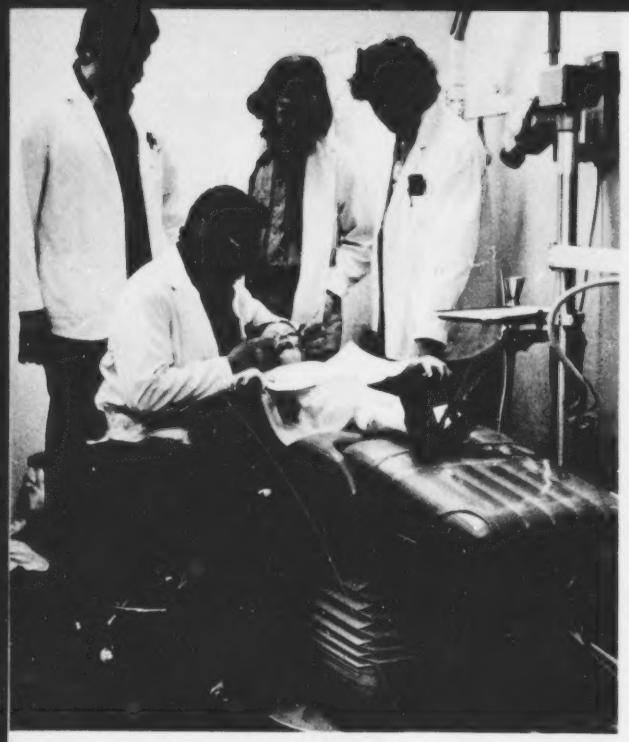
   c. developed ability to share information about their disability objectively

   d. increased their acceptance of the responsibility for their own health and welfare

They demonstrated these gains by developing learning concepts, activities, and self-evaluations which they wrote up for the printed modules. They also showed these gains by improved responses on questionnaires, class tests, and class discussions and projects.

Good Health Habits

Pictures Posed by Human Resources School Students
for Health - Science Fair

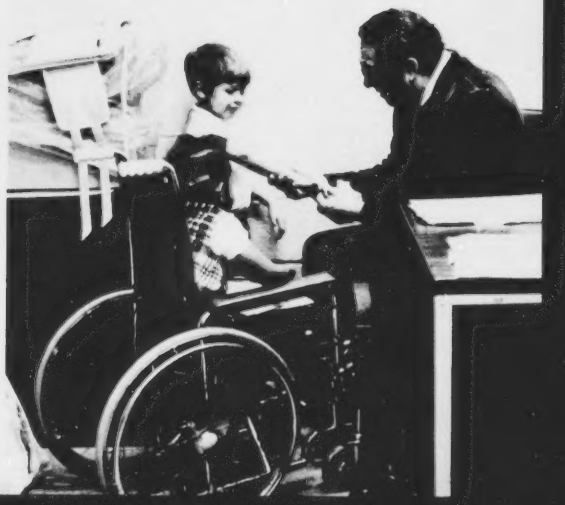


I'm having my regular dental check-up.

Hey, don't rub your eyes like that!

I am using my washcloth to clean my ears.

My lunch is well balanced. Is yours?



We have our "check-ups" every year.

I always read by a good light.

I am brushing my teeth properly.

I'm washing my hands before eating.

Don't put that pencil
in your mouth.

Rinse your mouth
after you eat if
you can't brush.

Yum, Yum, eat good snacks.

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I always cover my mouth
when I cough or sneeze.

I'm learning how to brush properly.

Don't shout like that in my ear!

Don't ever put anything in your ears.

Keep that pencil away from your eyes!

My glasses help ME to read better.

Don't sit so close to the T.V.

I have my hearing tested every year.

No, No, don't eat that candy!

Not so loud!

Modules in

Individual Health Status

Special Topics in This Module	Objectives
I. Daily Health Practices Maintain Fitness	Maintain fitness by daily health practices:
Daily bathing	Bathe daily.
Washing hands and face frequently	Wash hands and face frequently.
Eating nourishing meals	Eat nourishing meals.
Care of skin	Care for skin.
Care of feet	Care for feet.
Care of hair	Care for hair.
Care of nails	Care for nails.
Care of teeth	Care for teeth.
Good posture	Practice good posture
Standing or walking or movement	Stand, walk, or move if possible.
II. Long-Term Health Habits Are Important	
A. Getting Periodic General Check-ups	Get periodic general check-ups.
B. Maintaining Resistance to Infection	Keep up your resistance to infection.
C. Participating in Physical Activities	Participate in beneficial physical activities.

BACKGROUND INFORMATION K-6

General – Posing for pictures encourages immobilized students to figure out ways of managing health practices. They become intrigued with the necessity for demonstrating to others that there are alternate ways of accomplishing most activities of daily living. Ingenuity is the main requisite.

POSES FOR PICTURES DEMONSTRATING GOOD HEALTH HABITS

EYE
1. Reading in good light
2. Wearing glasses
3. Avoiding sharp objects
4. Using a vision-testing machine
5. Watching TV at proper distance
6. Don't rub eyes

EAR
1. Taking a hearing test
2. Do not put objects into ears
3. No loud music (earphones)
4. Washing ears with cloths
5. No shouting close to ears
6. Covering ears with ear muffs

NUTRITION
1. Eating a good lunch – sandwich, fruit, milk, salad

DENTAL HEALTH
1. Child brushing teeth
2. Eating good snack foods
3. Rinsing with water (if you can't brush)
4. Dentist visit
5. No chewing on pencils, pens, etc.
6. NO-NO tooth foods: gums, hard candies, lollipops, etc.

DISEASE PREVENTION
1. Washing hands
2. Cover mouth and nose while sneezing

PROPS

EYE CARE
1. Pair of glasses
2. Pins
3. Block
4. Broken glass
5. TV
6. Eyechart, eye 'patch" for testing
7. Lamp

EAR CARE
1. Q-tips
2. Needle
3. Radio and/or TV
4. Ear muff and/or soft hat
5. Wash cloth
6. "Hearing testing" machine

DENTAL HEALTH
1. Toothbrush
2. Toothpaste
3. Apple
4. Carrot
5. Celery
6. Green pepper
7. Cheese
8. Tomato

DISEASE PREVENTION
1. Band-aid or bandage
2. Soap
3. Plate

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
I. Daily Health Practices Maintain Fitness **Objective:** Maintain fitness by daily health practices: Bathe daily Wash hands frequently Eat nourishing meals Care for skin Care for feet Care for hair Care for nails Care for teeth Practice good posture: move, stand, or walk if possible		
1. Daily health practices have special significance for maintaining overall fitness and well-being. Bathing daily Washing hands and face frequently Eating nourishing meals Care of skin Care of feet Care of hair Care of nails Care of teeth Good posture – moving, standing, walking	1. For each daily health practice share an idea, and ask a classmate, or parent, or teacher for one idea: a. Why is each important for you? b. How can each practice be made easier for you or for someone who helps you? 2. Set up and pose for pictures which demonstrate the following do's and don't's of good health practices: **EYE** Always read and work in good light. Wear your glasses if you have a prescription for them. Keep all sharp objects away from your eyes. Have your eyes checked by a doctor at least once a year. Never rub your eye when something irritates it. Never punch or hit anyone in the eyes.	1. Make a list of the ideas for accomplishing your health practices efficiently. Keep a two-week checklist showing how many times you followed each idea on your list. 2. Use the pictures for an exhibit at a health fair or health week display.

2. Standing or Walking

General – Applicable to any student who uses a wheelchair for transportation but can stand with the aid of crutches, braces, a standing box, or a prop. – ex.: children with Spina Bifida, paraplegia, some polio, some M.D. in earlier stages, some osteogenesis imperfecta, arthrogryposis.

Enlist family's participation in vital activities.

Movement

General – If the severely disabled students understand the importance of movement for their circulation and bone growth, they can be motivated to view any movement of which they are capable as a positive contribution to their health status. They may be motivated to invent new types of "exercises" helpful to their physical problems.

A student with Muscular Dystrophy, or any student with weak arm muscles, should still be encouraged to do as much as he can for himself, including moving his own wheelchair. When he has done as much as he can, then, and only then, should the teacher push his chair.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
	EAR Have your ears and hearing checked once a year. Never put sharp objects (like pencils) into your ears. Never listen to a very loud television or radio. If water gets into your ears, dry them out carefully. Cover your ears with ear muffs or a scarf whenever it is very cold out. Never box anyone on the ears. **NUTRITION** Eat well balanced meals everyday. This is very important for good health! **DENTAL HEALTH** Brush your teeth after each meal. If you can't brush, swish water around in your mouth. If you can't brush or rinse your mouth, eat an apple instead. Eat nutritious meals to help your teeth grow and stay healthy. See your dentist *at least* once a year for x-rays, cleaning, and treatment of cavities. Never put dirt, pencils, or other objects into your mouth. Never bite on things other than food. **DISEASE PREVENTION** Wash cuts with warm, soapy water. Wash your hands before eating. Cover your nose when you sneeze. Cover your mouth when you cough. 3. Write your rules on ditto masters. Next to each rule make a drawing demonstrating the rule.	3. Make coloring booklets of the rules. Give them out at the health fair.

BACKGROUND INFORMATION K-6

DYSAUTONOMIA

DAILY BATHING – Daily bathing is important to avoid odor because of excessive nervous perspiration. Bath water temperature should be checked by thermometer or another person because of diminished sensations on skin to heat and cold. Use of underarm deodorants doubly recommended at puberty, but be careful of eyes with spray cans – (roll-ons might be safer).

WASHING HANDS AND FACE – Clean hands are important to avoid rubbing dirt into eyes.

EATING NOURISHING MEALS – Difficulty in feeding is the major complaint of parents throughout childhood. Because of lack of appetite and impaired taste buds, they should have smaller meals and frequent nutritious snacks as needed. Because of tendency to be underweight and low resistance to infection, a special effort should be made to eat nutritiously. Replenish salt lost by excessive perspiring. If chewing or gagging is a problem, learn to cut food into small manageable pieces or eat baby food or soft foods at these times. Bland diet is usually recommended because of tendency for gastric distress.

Oral feeding should not be given for 6 – 12 hours after a vomiting crisis has ended.

CARE OF SKIN – Blotching during periods of excitement is related to the condition and not a skin problem or allergy. Special care has to be taken when handling appliances that get hot, such as toasters, irons, pots, pans, etc. so that, because of insensitivity to heat, burns may not occur. The wearing of asbestos mitts may help prevent these burns.

Sometimes a pressure sore occurs from use of Milwaukee Brace because of decreased sensitivity to pain. Skin should be checked daily where brace comes in contact with the body.

CARE OF FEET – Feet may be cold and red due to poor circulation. Bottoms of feet are extremely sensitive.

CARE OF HAIR – The hair should be washed regularly because of frequent sweating, but caution should be taken to avoid becoming chilled.

CARE OF NAILS – Nails should be kept trimmed and filed to avoid ingrown nails.

CARE OF TEETH – May be a problem because of tendency to gag. An effort should be made to correct malocclusions because resulting speech and articulation problems increase. The number of caries is remarkably low. Plaque formation is high and contributes to gum disease. Due to medication their teeth may become discolored.

Although they don't have many cavities they do have abscesses, gum disease, and malocclusions. The abscesses are usually silent because of their indifference to pain. Anesthesia is a problem. General anesthesia is a risk and local anesthesia requires extremely careful monitoring. If the child has difficulty locating where the brush is in his mouth, he may use a mirror. If he finds brushing nauseating or difficult to coordinate, a wet piece of gauze can be used to lightly clean the gums.

GOOD POSTURE – Skeletal problems such as scoliosis (spinal curvature) often accompany other symptoms of dysautonomia and require wearing a brace (Milwaukee Brace). A child needs assistance from parents in putting on brace before dressing. The brace is very important, even though it may contribute to poor coordination and it may also make good posture difficult. Play activities in younger children should encourage balancing and coordination of movements. A dysautonomic child is able to sit in unusual positions because of decreased pain appreciation. It is up to supervising adults to encourage more normal positions of posture.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
2. Standing and/or walking for short periods several times a day help circulation and bone growth.	1. Have SNT or physician give a lecture on the importance of standing each day, pointing out ways that each student might accomplish this.	1. Make a graph showing the total number of times that you stood each day. Ask a member of your family to help you stand daily at home and then to check your graph daily.
	2. Plan a schedule of standing periods, checking with teachers for aid.	2. Try out your standing schedule, making adjustments where necessary. Follow it daily.
II. Long-Term Health Habits Are Important		
A. Getting Periodic General Check-ups		
1. Long-term health habits such as periodic medical check-ups (in addition to disability-related treatments) are important to maintain health.	1. Ask your school nurse-teacher for help in determining how often you need a general check-up in addition to the doctor visits you have because of your disability.	
	2. Make arrangements for a general examination, planning a schedule for future visits.	2. See SNT again after doctor visit to discuss what was checked. Schedule another discussion of the way you feel after any treatments.

BACKGROUND INFORMATION K-6

SPINA BIFIDA

DAILY BATHING – Hand rails and tub seats may help the child when transferring in and out of the bathtub without any assistance. Because of physical exertion required for walking with crutches or braces a deodorant should be used regularly after the onset of puberty.

WASHING HANDS AND FACE – Children with Spina Bifida who are in wheelchairs need to wash their hands before touching food, rubbing eyes or face since hands get dirty from the wheels of their wheelchair. Hands also should be washed thoroughly after handling urinary appliances.

EATING NOURISHING MEALS – Children who are not as active tend to put on weight. Avoid snacks and sweets. Drink plenty of liquids – cranberry juice is often suggested since it has a beneficial effect on the urine. Fluids help to dilute uric acid.

CARE OF SKIN – When bathing it is very important to check the temperature before entering the tub. Crawling or pulling himself along on rough surfaces or floors can cause injury to skin of knees, toes, and buttocks. Changing diapers frequently and washing skin will keep it in a healthy state. Do not allow him to sit in wet diapers for an extended period. Examine skin for reddened areas, abrasions or bruises every day after removing his braces. Let the child use a mirror to check areas which are difficult to see and may be insensitive to pain. If the skin becomes red or breaks down, keep the area clean, leave braces off, and expose area to air until healing takes place.

CARE OF FEET – Feet and legs are insensitive to pain. Wearing socks that are thin white cotton without ribbing, webbing or elastic and surgical shoes that lace all the way down to the toes would be best for the health of their feet. Place fingers inside the shoes to feel that all his toes are flat (since the child cannot feel if his toes are cramped). Parent or child himself should inspect his feet daily for signs of pressure sores since it is very important to avoid pressure sores on toes.

CARE OF NAILS – Toenails should be carefully trimmed to avoid ingrown toenails which might cause an infection because the child is not aware of pain.

CARE OF TEETH – May be discolored from medication.

GOOD POSTURE – Sitting should be limited to 2 hours at a time. A child can do pushups while sitting in his wheelchair. He should walk or stand for at least four 15 minute periods a day, change position every 2 hours. It is unsafe for the child who normally wears braces to attempt to stand or walk without them.

All health habits are interrelated and each is dependent upon the success of the others. For example, urinary incontinence contributes to development of decubitus ulcers, poor body alignment and *infrequent* change of positions results in contractures, deformities, and spinal curvatures, and the presence of ulcerations and deformities makes it impossible to apply braces to aid in walking.

MUSCULAR DYSTROPHY

DAILY BATHING – Sit in bathtub to avoid falling. Wheelchair-bound children use a hoyer lift into the bathtub.

WASHING HANDS AND FACE – May have to be done with a wash'n'dri or a washcloth and soap, by someone else. Especially important if he is falling frequently or moves his own wheelchair with his hands.

EATING NOURISHING MEALS – Good nutrition is important for physical fitness and bowel functioning. Portions based on need. When child goes into wheelchair, he should watch his intake. Later, as wasting occurs, the appetite will be less. Sometimes feeding a child is necessary. The inability to close his mouth (from weakened muscles) can cause problems in chewing.

CARE OF SKIN – Changes of underwear, socks, etc. and powdering to prevent irritation and odor. To avoid pressure sores use cushions, pieces of sponge-rubber, water cushions, etc.

CARE OF FEET – Wearing proper high orthopedic shoes from earliest years will deter feet from becoming deformed.

CARE OF HAIR – Use a hairdresser's tray or suspend child's head over edge of the bed using a rubber sheet and basin. Shampooing may also be managed by reversing the chains of the lift and lowering his head over the sink.

CARE OF NAILS – As the child progresses in his disease help with cleaning, cutting and filing his nails will be necessary.

CARE OF TEETH – Oral hygiene is important. Rinse mouth into a basin at times when brushing is impossible. For brushing, use an electric toothbrush. He may need help from another person in brushing his teeth. Dental visits are important to prevent cavities.

GOOD POSTURE – For older students (in wheelchairs) good sitting posture should be maintained before scoliosis becomes permanent. Changes in position (lying down) at intervals promotes better cardio-pulmonary function and maintains comfort of the back. Molded plastic sitting jackets will delay the development of scoliosis which affects cardio-pulmonary fuction negatively. Inadequate function can lead to death.

For students with advanced muscular dystrophy, rest periods or naps during the day, and frequent changes of position will improve overall well-being.

ARTHROGRYPOSIS

DAILY BATHING – Usually need assistance due to immobile joints. Therefore consideration of the *child's needs* should be *foremost* in all areas of personal care. Since they cannot reach many areas of their bodies, ingenuity is needed to devise an appliance resembling a backscratcher with a sponge or washcloth at the end. A long-handled bathbrush is another possibility. A large bath towel with a hole in the middle could drop over his head poncho-style and allow him to wiggle and pat himself dry. Grab bars, suctioned rubber bath mat, and a high tub seat with rubber-tipped legs may also be helpful.

WASHING HANDS AND FACE – They cannot wash their own face.

EATING NOURISHING MEALS – A good, well-balanced diet is important for these children because a weight gain can cause problems in mobility (walking). Some children are unable to feed themselves due to immobility of elbow joint, etc. Therefore, consideration should be given to preparation of food if someone has to feed the child. Long-handled utensils, a plate-guard rim on the edge of the plate, and long straws eliminate some frustration.

CARE OF SKIN – Many cannot apply their own make-up or care for facial skin because of inflexible elbow joints. A pair of tongs could hold a sponge or powder puff.

CARE OF FEET – Properly fitting shoes are important if the child can walk. Sometimes the ankle joints are stiff so the shoes do not fit as well as they should. A long-handled shoe-horn may be helpful in independent dressing.

CARE OF HAIR – Because of inflexibility of elbows, children cannot comb their own hair, or put it up in curlers, or blow dry or style it. A special long-handled comb may make it possible. A weekly visit to a "beauty parlor" for a shampoo and an easy-to-keep hair styling would be an especially practical investment for females.

CARE OF NAILS – Assistance will be required in trimming nails. However, another way might be to rub nails against a securely fastened emery board. A nailbrush could be secured by suction cups on a counter near a sink.

CARE OF TEETH – Usually children are dependent on someone for brushing their teeth. If the other person is not concerned about dental care, it can cause problems. A long-handled toothbrush which can also be adjusted to different angles can be helpful or on adapted electric toothbrush.

GOOD POSTURE – Good posture when sitting or standing may have beneficial effect on their normal growth. However, many of these children have immobile hip joints and cannot sit in a chair. A raised chair and a high bed (raised on wooden blocks) make sitting and rising easier. Surgery is often performed to improve the functional position of the hands and other joints.

CONGENITAL AMPUTEES

DAILY BATHING – Frequent bathing will help to prevent pressure sores on stumps. Since walking with a prosthesis requires a considerable expenditure of energy, bathing and deodorizing is important to cleanse perspiration.

WASHING HANDS AND FACE – The inside of a prosthesis should also be washed to prevent growth of bacteria. Prosthetic hand should also be cleansed since it is used to help feed the person. Many helpful devices make one-handed washing easier.

EATING NOURISHING MEALS – Lower limb amputees especially must avoid weight gain as much as possible. Armless children can feed themselves with specially designed long-handled spoons, or with a functional hook attached to the prosthetic arm.

CARE OF SKIN – The skin on the stump of the limb has to be given special attention to avoid irritation from the prothesis. (Do not wear the prosthetic if there is a pressure sore.) Stump socks worn under prosthesis protects limbs from friction which could cause blisters. Stump socks are made to conform to the shape of the stump. They should be durable and absorbent, changed daily, and pulled on carefully all around to eliminate wrinkles. If damp from perspiration be sure to dry.

CARE OF FEET – A good fitting prothesis is necessary and important for a good gait (if it is a lower extremity). The stump should be bathed daily with a mild soap, dried thoroughly, and body powder applied. Folds of the skin should be carefully dried.

CARE OF HAIR – A problem for upper extremity amputee but with protheses it can be managed quite well.

CARE OF TEETH – For a child who is an upper extremity amputee, assistance may be required. A stand might be devised on which an electric toothbrush could be attached while the child is using it.

GOOD POSTURE – Correct posture should be encouraged if the artificial limbs do not prevent proper gait. A properly fitting leg prosthesis can correct weight bearing problems which might otherwise cause deformities. Absence of the tibia or a part of the femur prevents normal weight bearing, so that in addition to distortions in body alignment, bone atrophy will occur because of inactivity. Knowledge of such consequences explains the importance of the early use of appliances to aid in good body alignment and to make possible weight bearing and locomotion which stimulate bone growth and prevent atrophy and secondary deformities.

Medical opinions differs as to the most suitable time for application of an arm prosthesis as it may impede learning since it interferes with the sense of touch.

OSTEOGENESIS IMPERFECTA

DAILY BATHING – He may need assistance getting in to and out of the tub. Extra care must be taken to avoid slipping. Rubber mats and appliques, handrails, etc., are advisable precautions. When in a cast, the child should be encouraged to wash whatever areas he can reach. (When they are in casts and cannot use a tub.)

WASHING HANDS AND FACE – Help may be needed when arms are in casts. Encourage them to wash themselves if possible with your supervision.

EATING NOURISHING MEALS – A good, well-balanced diet will promote better growth and healing post-operatively. Avoiding fattening foods is important because overweight can cause the child further physical limitation in mobility, and discomfort from confinement of casts.

CARE OF SKIN – It is especially important in areas covered by braces and around the edge of a cast. After a cast is removed, skin may be dry and scaly. Frequent washing and application of baby oil to restore normal moisture.

CARE OF FEET – Younger children may be in casts or in a wheelchair. Feet and legs may be braced to avoid fracturing from weight bearing. Inspect feet and legs for pressure spots.

CARE OF HAIR – For children in casts, or those who cannot be moved much, shampooing can be accomplished with a hairdresser's tray or a rubber sheet and plastic basin placed on the back of the litter, wheelchair or bed. There are plastic shampoo "crowns" that protect the eyes, and plastic capes which can tie around the neck on one end and drape into the sink or basin on the other.

CARE OF NAILS – Independent except in severe cases. Help is needed when they are in casts.

CARE OF TEETH – Many have malformation of the dentin. Enamel is normal, but because it rests on a foundation of poor dentin it chips, and teeth may be lost by age 30. (There may also be short roots and obliterated pulp canals.)

GOOD POSTURE – Older students and less severely involved younger ones should be encouraged to ambulate – important for muscle development and growth in general.

ACHONDROPLASIA

DAILY BATHING – A step-stool may be necessary to help get in and out of the tub.

WASHING HANDS AND FACE – Sinks, etc. should be set lower or a step-stool used.

EATING NOURISHING MEALS – Well-balanced meals should be proportionate to appetite. Eating more will not make an achondroplastic grow. Excess weight will only put a strain on their heart and total body.

CARE OF SKIN – They may need help washing back.

CARE OF FEET – Properly fitted shoes are important.

CARE OF TEETH – Toothbrushes are often placed out of the reach and sinks are high. Sturdy step-stools may help.

GOOD POSTURE – A tendency for lordosis makes long periods of standing uncomfortable. Furniture usually made for "normal" size may cause poor sitting posture. Furniture should be adjusted to the child rather than vice versa. High doorknobs, light switches necessitate frequent reaching or climbing.

CONGENITAL CARDIAC CONDITIONS

DAILY BATHING – Cleanliness reduces chances of infections to which a child with a cardiac condition is prone.

EATING NOURISHING MEALS – Some children with congenital cardiac problems have to be on a salt free or low salt diet. This includes baking powder and baking soda as well as salt. This helps in reducing the accumulation of body fluids.

CARE OF TEETH – Poor dental hygiene promotes infection, caries, etc. and any source of infection is dangerous for a child with a cardiac condition. Usually the child with a cardiac condition is put on a prophylactic dose of penicillin for a few days (ie.: one day before an extraction, day of treatment, and day after extraction.) For extensive dental treatment the children are often hospitalized.

Adequate rest and sleep are essential – including rest periods or naps during the day when fatigued. Avoid becoming over tired.

HEMOPHILIA

DAILY BATHING – Care should be taken to prevent slipping or bumping against side of the tub.

WASHING HANDS AND FACE – Care of the face, especially during adolescence, will help to avoid acne and skin irritations. When young adults start to shave, this is especially important. Electric shavers are advised for young adults.

EATING NOURISHING MEALS – Nourishing, well-balanced meals which do not add weight. Body fat does not serve as a padding against bumps. Foods to be avoided: Those with sharp bones, like chicken or fish; foods on sticks – ice cream; some candies such as lollipops.

CARE OF FEET – Shoes should fit properly to avoid blisters. Good, strong shoes can protect against injuries.

CARE OF NAILS – Properly filed nails will avoid injury from scratching and possibility of infection from a hangnail.

CARE OF TEETH – Especially thorough and frequent cleaning and brushing of teeth and exercising of gums is important to prevent tooth decay because of problems with extractions and bleeding gums. Dental care should begin at a very young age and be scheduled every six months. Restriction of sugary snacks should also be emphasized to reduce tooth decay.

GOOD POSTURE – Being overweight can put a strain on joints which may be tender from repeated bleeding episodes. Excessive bleeding into joints can cause painful limitation of motion and deformity. Most frequent site (over 80%) of bleeding is into the muscles and joints. Hemorrhage into a muscle may cause scarring and contractures and damage to surrounding nerves. Early and prompt treatment of a bleeding episode is the best protection against contractures and deformities which permanently affect posture.

B. Maintaining Resistance to Infections

2. Dysautonomia – Tendency toward pneumonia because of difficulty in relieving congestion in bronchial tubes or lung.

3. Muscular Dystrophy – The weakening of the muscles of the chest wall diminishes their ability to cough productively. Therefore a respiratory infection is very serious.

6. Osteogenesis Imperfecta – The children who are more fragile and do not move about or even sit in an upright position have a tendency to develop pneumonia more quickly. Therefore, it is important for the child with O.I. to remain as free of upper respiratory infection as possible. Severe coughing can cause fractures in the rib cage and vertebrae.

8. Congenital Cardiac Conditions – Respiratory infections are dangerous because of the stress upon the heart.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
B. Maintaining Resistance to Infections **Objective:** Keep up your resistance to infection. Certain methods of maintaining resistance to infections are vital. 1. eat a balanced diet 2. take precautions against catching colds by wearing suitable clothing and avoiding sudden temperature changes 3. treat colds or illnesses promptly 4. get plenty of sleep 5. avoid crowds during flu season.	1. Tell how each of the following practices could help you to keep up your resistance to infection: eating a balanced diet wearing suitable clothing taking care of colds getting plenty of sleep avoiding crowds during flu season	1. Keep a diary for a week on your success with each practice. Make a graph for each practice and rate yourself weekly on the graph.

BACKGROUND INFORMATION K-6

Team or individual recreational activities are often the best way to motivate physically disabled students to use their physical abilities to full capacity and to overcome their reluctance to move around.

In gym they need a thorough orientation to the play areas and the use of the equipment. They will profit by a series of lead-up activities designed to give them an awareness of the nature of balls of various textures, sizes, and weights, an ability to anticipate the movement of balls or moving objects, and practice in navigating on crutches or in a wheelchair.

1. **Dysautonomia** –

Cautions:

1. These students fatigue easily
2. Guard against salt depletion especially on hot humid days.
3. Unsafe to allow students to put head under water while swimming.

3. **Muscular Dystrophy** – Depending on their stage of MD some children can stand and do activities while others must use a chair, or their own wheelchair and play the games from a seated position.

If a child with MD is playing in a game where a ball is being thrown, it must be remembered that he cannot duck if the ball is coming at him fast.

4. **Arthrogryposis** – Stiffened joints prevent the children from moving very fast or protecting themselves if they are falling.

5. **Congenital Amputees**

Games, Sports and Exercises

There is almost no area of competitive organized athletics in which the unilateral amputee cannot participate, and he should be encouraged to participate within the limits of his capacity.

Baseball is a popular sport, and many below-elbow amputees have been fitted with a special baseball glove attachment to their prosthesis. Some prefer to put the baseball glove over the terminal device.

In contact sports (football, soccer, basketball, wrestling) an upper-limb prosthesis should never be worn, but in many competitive sports with little or no contact, such as baseball and golf, the active use of a prosthetic terminal device is almost essential. In other activities (tennis, badminton, and track and field events, such as shotput, discus and javelin throwing) wearing an upper-limb prosthesis may help maintain balance and timing.

It is also possible for many bilateral amputees to participate in athletics and achieve the same success as their normal contemporaries.

- Variation in ability to use artificial limb in gym

- Some may do better with it
  Braces are usually clumsier than prostheses.
  A braced individual may not be in a stabilized position.

Arm amputees

Double hook is superior for holding and moving objects.
With elbow joint, prosthesis can be used more effectively.
Ability to participate – may depend on strength and coordination in other arm

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
C. Participating in Beneficial Physical Activities **Objective:** Participate in beneficial physical activities. 1. There are physical activities beneficial for students with limited motion, limited feeling or limited strength.	1. Interview a physical therapist or physical education teacher and ask him to advise you about which of the following suggested physical activities would be beneficial to your health. **1. Dysautonomia** **Non-contact sports and games** Lawn Bowling Croquet Miniature golf Ping-pong Shuffleboard Walking Swimming – with great care Billiards and pool using a cue rest Rhythmics and dance Exercises for prevention of postural disorders	1. Learn the rules for one recommended physical activity you have never played. Practice the fundamentals three times a week for a month. Then hold an invitation tournament in this activity with your classmates.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
	3. Muscular Dystrophy **Passive games** Table-top push ball with sideboards to keep ball on table. Blowing ping-pong balls toward each other or into goals on table. Maze boxes made of cardboard with holes or partitions for rolling a ball – set on players lap – attempts to bring ball along a pathway by tilting board in his lap. Can compete by timing and/or score. Pin-ball games Slot machines Billiards and pool using a cue rest Swing-ball bowling using tetherball and bowling pins on a long rope so ball almost touches ground. Real bowling – in which bowling ball is placed on a stand by a helper (Child positions stand in advance) Then child pushes ball with 1 or 2 fingers. It slides down grooved stand and rolls down alley. **4. Arthrogryposis** Balloon volleyball with a lowered net Pitch-putt golf Shuffleboard Bowling with adapted bowling frame unit Croquet Billiards and pool using a cue rest	

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
	5. Congenital Amputees **Leg Handicaps – or Amputations** Archery Badminton (in fixed position) Basketball (foul shooting) Bowling – using stool or wheelchair Arm and torso calisthenics Chinning Croquet Darts Golf – miniature Horseshoes Parallel bar Ping pong Punching bag Riflery Rings Rope climb Shuffleboard Swimming Tumbling – especially for practice falls Wheelchair games **Handicaps or Amputations of both arms** Calisthenics for trunk and legs Cross country Football – field goal kicking Swimming – with flotation device or flippers Track, if balance is adequate Dancing and rhythmics, if balance is adequate	

Amputees:

1 leg – scissor kick more effective than breaststroke kick in swimming.

Double leg amputees:

Modify position of body while doing sidestroke and breaststroke

Breaststroke – drop 1 shoulder to permit face to be turned to one side
Sidestroke – will be partially on front and partially on side
Gliding phase of sidestroke much shorter
Gliding phase of breaststroke shortened or outward sweep of arms reduced to semi-circles

Amputees using artificial legs need practice in learning to fall safely.

Arm amputee also needs this practice since he may lose balancing function of arms.

"If the child has arms, he should be instructed not to fall on a stiff arm, but rather to take the fall on the shoulder or the forearm, with the elbow bent, and to tuck his head and chin under and roll into a ball. A unilateral amputee should try to fall on the shoulder of the sound side, with the head tucked under. When the amputee starts to fall, he should not fight it, but roll with it if he can, always trying to avoid falling on his prosthesis."

(Blakeslee, B. (ed.) The Limb Deficient Child. Berkeley: University of California Press, 1963)

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
	Swimming **One arm** All of the above + Croquet Golf – miniature and putting Ping pong Shuffleboard **Learning to fall** Practice rolling on gym mats.	

BACKGROUND INFORMATION K-6

8. Congenital Cardiac Conditions

Cardiac symptoms which child should recognize for regulating own activities:

- shortness of breath
- pain in chest
- excessive fatigue
- swelling of the ankles and lower legs
- pain in upper right abdomen (from liver – signal to take it easy)

Investigators shy away from specific sports

Recommendations:

Limit competitive interscholastic activities.

Recommend *against* isometrics – weight lifting, wrestling and gymnastics for children with aortic stenosis and coarctation of aorta.

Patients with mild general restrictions should avoid over a 1/2 min. of top-level exertion.

Those with moderate restriction should avoid competitive pressures of team sports except baseball and maybe volleyball, and shouldn't do physical fitness testing which requires all-out effort.

Stop to rest when necessary.

Carefully supervised water exercises.

Floating in different positions in water.

Swimming short distances in shallow water.

Rheumatic heart disease – most may exercise but should avoid peak efforts and exhaustion.

9. Hemophilia

In more serious bleeding disorders, vigorous motion can result in bleeding in joints and can lead to crippling deformities, as can running upstairs. However, stair climbing is easier to regulate than restraint on the sports field.

Note: Hemophilias do not bleed harder or faster than others – just longer.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
	8. Congenital Cardiac Conditions Depending on the advice of your doctor and your own ability: baseball skills volleyball skills swimming short distances floating billiards pool croquet miniature golf **9. Hemophilia** If mild – with bleeding only after trauma: Badminton Basketball foul shooting Croquet Dancing Rubber-tipped darts Frisbee Golf-putting and minature Ping pong, pool and table games Rhythmic exercises Shuffleboard Swimming in a small group with everyone instructed to move cautiously and near poolside. Also water exercises.	

2. **Spina Bifida** – (1) Avoid trauma to legs because the loss of sensation caused by spinal defect will prevent the child from realizing he has been injured – Besides, the bones are thinner and more brittle. (2) Avoid trauma to the head because of possible presence of shunt which is removing excess cerebro-spinal fluid from the head.

PHYSICAL AND RECREATIONAL ACTIVITIES FOR YOUNG STUDENTS IN WHEELCHAIRS

SPINA BIFIDA & LOWER LIMB AMPUTEES

Driving wheelchair in relays – team or individual races or over obstacle course

Relays with balls

Pass ball while sitting in a circle

Balls suspended on long strings may be passed around a circle, batted between children

Beanbag attached to wheelchair with a string may be thrown at ball as it is being swung by another child

Ball-bouncing from wheelchair

Target throw with tennis ball at vertical targets on a fence or shelf

Beanbag catching games between wheelchairs with long string attached to chair – later, no string

Basic movement to increase movement without wheelchair or crutches:

Rolling, stretching, etc. on mats

Back slide on ground pulling self on rope

Stomach slide along smooth beam 3-4 inches wide

Pulling selves up vertical wall ladders or ropes

Parachute game – round nylon material – children hold it around periphery – circular material may be divided or marked off and ball moved back and forth

SPINA BIFIDA & PARAPLEGIA

Also – **Older Osteogenesis Imperfecta and Leg Amputees**

Vigorous Games for students with strong upper body

Tether Line Games
Archery
Vollebyball and others for teamwork
(using beachball)
Endball with a tetherball attached to a horizontal line
Basketball shooting with baskets at easy height and preferably tilted
Wheelchair soccer – moving ball by bumping it with front of wheelchair
Field soccer
Handball with a volleyball-size ball
Zone basketball
Base games using a whiffle ball and a plastic paddle
"Snatch-the-ball" – with a volleyball on a stand – snatch it or just knock it off stand
Field Hockey
Swimming –
Backstroke easiest for him to learn
Goal-increase endurance
In face-down position, breaststroke is preferred

Special Topics in this Module

I. Understanding the Relevant Physiology of Disability

Behavioral Objectives

Understand the relevant physiology of your disability.

BACKGROUND INFORMATION 7-12

RELEVANT PHYSIOLOGY OF DISABILITY
DYSAUTONOMIA

Problems:

1. Function of the autonomic nervous sytem
2. Relevance to respiratory system
3. Relevance to Lacrimation
4. Cause
5. Heredity

1. Function of the Autonomic Nervous System:

The nervous system is a means of receiving information from the outside world, or transmitting it from one part of the interior milieu to another, and setting up an appropriate response to such stimuli. Certain automatic functions occur without thought or exercise of will. Most of the autonomic functions (because it has autonomy) are carried out without the conscious mind being aware of them. The sight of food stimulates the flow of saliva, placing something far back on the tongue initiates swallowing, rate of heart beat is varied according to body needs, blood pressure is regulated accurately, body temperature is held constant, stomach and intestinal activity is adjusted; perspiration, tears, and many other functions are all under autonomic control without the aid of thought or will.

In man conscious acts are under his control. However, it is not always possible to draw a sharp dividing line between autonomic and voluntary actions. For instance, breathing is regulated autonomically as a rule but, can be voluntarily controlled at will.

Whenever there is any kind of sensory experience or emotional experience there is some kind of mental impression involved, and some kind of active or passive reaction to it.

Sensations registered in the mind from the abnormally behaving autonomic system must have a marked effects on the child's thought process.

A child with dysautonomia has a non-functioning autonomic nervous system. Therefore necessary adjustments because of their unpredictable internal environment cause many difficulties.

2. Relevance to Respiratory System:

The lungs are covered by a double pleural membrane. One part adheres tightly to the lungs and the other covers the inside of the thoracic cavity. These membranes secrete mucus that acts as a lubricant, permitting the lungs to move freely in the chest during breathing. Coughing helps to rid the lungs of excess secretions.

The dysautonomics have excessive secretions but do not cough automatically.

Although nothing will make lungs stronger, learning how to breathe properly will help lungs to function better.

Breathing ability may be improved by exercises, posture, braces, IPPB machine, and games such as blowing a balloon.

Some physicians teach the children a routine of counting each breath as they walk to help in reminding the child to breathe properly.

Since avoidance of respiratory infections is important, dysautonomics should avoid close contact with friends who have colds, over exposure to cold weather, and wear proper clothing at all times and receive prompt attention when a cold starts.

3. Relevance to Lacrimation:

In normal eyes, tear glands keep the surface moist. Tears wash over the eye and drain into the tear duct in the lower corner of the eye socket, which leads to the nasal cavity. Because tears contain anti-bacterial enzyme, they are mildly antiseptic.

Since the eyes of dysautonomics do not produce tears, and have reduced sensation in the eyeball, the student must learn to protect the eyes, possibly with moisture chamber goggles or to put in "artificial tears" on a schedule prescribed by a physician. Another precaution is to avoid the outdoors on windy days and avoid rubbing their eyes if there is a feeling of irritation.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
I. Understanding the Relevant Physiology of Disability **Objective:** Understand the relevant physiology of your disability. Understanding the relevant physiology of your own disability will help you to develop important health habits.	1. Investigate the physiology of your own disability by using library books and reference materials, and by interviewing your physician, nurse, and teacher for any information they can give you about it. 2. In the *Index of Organizations* look up the address and write to the organization which is devoted to the study and aid of your disability.	1. Make your own appraisal of your health status based on the physiology of your disability.

4. Cause:

There is a possibility that the dysautonomics have an abnormality or deficiency of the enzyme in the nervous system which speeds up chemical reactions and thus facilitates normal physiological processes.

5. Heredity:

Dysautonomia occurs almost exclusively in Jewish children. It is *thought to be* simple recessive – on this theory there is a 25% or 1 in 4 expectancy for parents of one dysautonomic child to have another.

RELEVANT PHYSIOLOGY OF DISABILITY
SPINA BIFIDA

Problem – Total or partial paralysis of body below the spinal defect

Relevant physiology –

Physiology related to the insensitivity to pain below the spinal defect. How pain protects the body:

We have sensitivity to touch, heat, cold, and pain because nerves transmit electrical impulses from skin to spinal cord and brain.

We can move limbs and other bodily parts because of nerves that enter muscles from the brain which cause the muscles to contract.

In spina bifida, nerves from spinal cord to muscles and skin below the myelomengicele are smaller and thinner and may have only 10% of normal number of nerve fibers so feeling and movement of muscles of legs is hampered.

Physical care necessary to compensate for lack of feeling:

1. Protecting against injury (since they don't feel pain, motivation for avoiding injury is diminished).

2. Visual checking for skin breaks, cuts, etc.

3. Promptly caring for wounds, etc. to prevent infections.

4. Recognizing other signs of infection like elevated temperature and chills.

5. Changing position frequently and not sitting for more than two hours at a time.

Problem – Because of spinal defect the nerves to the bladder and intestines are damaged and cause incontinence of bowel and bladder.

Relevant physiology –

Physiology related to function of kidney and bladder to overall health:

Physical care necessary to compensate for neurogenic bladder:

1. Deficiency of nerve fibers that causes muscle weakness and sensory loss also effects urinary bladder and lower bowel. Inadequate number of nerves cause lack of strength to expel urine or stool.

2. Kidney filters waste products from blood stream and transmits them through slender tubes (ureters) for temporary storage in bladder.

3. Continual pressure in bladder (from not being emptied) forces open the bladder apertures of the ureters and dilates the tubes. Also the bladder contains millions of bacteria which can infect the kidneys so that they can no longer filter waste products from the blood stream. Complete emptying of the bladder on regular schedule is important. Residual urine is highly concentrated and frequently is infected with bacteria. Must be drained by catheterization. "Crede Procedure" – squeezing and bearing down to empty the bladder or blowing a balloon is a good method to use.

4. Liquids (water) keep urine diluted and "flush out" the bladder, prevent precipitates (stones) from forming and infection from developing.

5. Formation of kidney and bladder stones reflects disturbance of calcium metabolism as well as disorders in the urinary tract. Musculoskeletal activity is of primary importance. Passive and active exercises may be useful but most effective are those which prevent rapid loss of calcium from bones by at least simulating the stress of weight-bearing.

BACKGROUND INFORMATION 7-12

6. Generous fluid intake 3,500 to 4,000 ml. daily will reduce the likelihood of supersaturation by providing a greater volume of solvent and is, at the same time, a useful hygienic measure. Since the usual calcium salts precipitate more readily in an alkaline medium, acidulation of the urine is desirable . . . cranberry juice is good, 250 ml. twice a day.

Hereditary aspects: Unknown. But studies show above normal incidence of spina bifida, hydrocephalus, or spinal cord damage in siblings of children born with spina bifida.

Treatment:

1. It is possible to repair certain myelomeningoceles surgically soon after birth.

2. Because there is often an interruption in the normal flow of the cerebro-spinal fluid causing the development of hydrocephalus, a shunt (or by-pass) is performed to relieve the pressure on the brain and skull. The excess cerebro-spinal fluid is diverted into the circulatory system, the pleural cavity or the abdominal cavity. If this pressure is not relieved, brain damage can result.

3. To reduce the chance of kidney damage if the child has had repeated urinary tract infections, a diversionary procedure is done called an ileal conduit. In this procedure a small section of the bowel is used to which the ureters are attached and one end is brought up through the abdominal wall allowing the urine to pass directly out of the body into a collecting bag worn on the abdomen. The other end of the piece of intestine is closed.

INFORMATION TO BE INCLUDED IN LESSON ON SPINA BIFIDA

Spina bifida defect occurs in 2nd or 3rd week of fetal life when the spinal column develops. Now doctors can do amniocentesis to detect it.

Show transparencies picturing myelomeningocele. Nerves in spinal cord are stretched and damaged when spinal cord protrudes from an opening in the spinal column. This causes loss of feeling and muscle tone, interruption in function of spinal cord and of bowel and bladder control. The higher the defect, the more involvement.

Surgeons repair protrusions surgically.

There is an interruption in normal flow of spinal fluid because of a disturbance in absorption of cerebro-spinal fluid and it accumulates in the brain causing pressure which can damage the brain. A by-pass or shunt relieves pressure by draining the cerebro-spinal fluid from the ventricle to heart or stomach or other body cavity.

The shunt needs revision occasionally and the symptoms of a poorly functioning shunt are headaches, nausea and dizziness.

Since the kidneys may be damaged and infected by urine which is not excreted, a "Bricker" or diversionary procedure (Ileal conduit) is done which passes the urine directly out through abdominal wall to an attached bag.

Medicine is given to prevent infection and to keep the chemistry of the urine as neutral as possible.

Getting up and walking is important. Circulation in the lower extremities isn't good. A Decubitus (skin breakdown) can develop at the point where the bone or ischeal tuberosity puts pressure on skin of the buttocks.

If the legs are kept immobile, or not in braces – tightness in joints occurs (contractures).

Standing puts pressure on bones and muscles. This pressure contributes to normal growth. Walking uses muscles which press against blood vessels, which increases circulation, which improves circulation in lower extremities. Important to move all limbs as much as possible.

A person with an injury to the spinal column and spinal cord has similar problems.

BACKGROUND INFORMATION 7-12

INFORMATION FOR LESSON TO EXPLAIN IMPORTANCE OF CARE OF KIDNEYS (L. Bertan)

Demonstration

Put NaCl on cucumber slices. Place slices in a collander with paper towels underneath the collander. Observe how salt drives out the water – by osmosis – and that's how kidney works.

Osmosis is the passage of fluids through a membrane. Substances go from areas of greater concentration to areas of lesser concentration.

Principle of osmosis is also the principle of entropy – explain.

Loops in kidneys pick up wastes from blood vessels. The more membranes you have the more rapidly osmosis can go on.

What are the excretory organs? kidney – skin. Show a calf's kidney from a butcher shop.

Excretion is removal of poisonous (or toxic) materials such as urea – uric acid.

Egestion is the removal of undigested material from the body from the large intestines – solid waste.

Why is this critical?

Understanding Amino Acids

All proteins are composed of amino acids. Proteins are what we are made of. Amino acids compose DNA – are building blocks. What builds up will break down into these three: CH_4 (methane); NH_3 (ammonia) and H_2O (water). It is thought that these three were the original make-up of the atmosphere.

Breakdown of amino acids in body – into poisons – nitrogen products.

Wash ammonia off skin with water. It is important to get rid of ammonia fast.

Kidneys work continuously – urea is stored in the bladder to be removed at convenient times.

If you are lying down or sitting all day urine accumulates.

When taking diuretics for weight loss, patients are instructed to take them before lying down since that position will help to accumulate the fluid.

It is important to go to the bathroom often and drink as much as possible and move as much as possible.

Best position to assume to empty out the bladder is standing.

With more movement, the muscles press against the organs.

Exercise is important. Accumulation of liquids is important.

Balance of Salts

Why do you have to have so much water?

Why do you have to have a little salt? To hold onto some water.

The body can lose water and salt through skin, especially in hot, dry weather.

The body also needs salts to carry nerve impulses.

(Calcium balance is upset in tetanus, also in older women)

Calcium gets out of the body through kidney stones.

Solutions that are saturated or super-saturated.

How do you get that crystal formation? How do kidney stones form? Where do kidney stones form? Kidney stones form in the bladder or in the urethra. Can insert a tube (catheter) into urethra. Physicians don't like to open the bladder – may cut through nerves and then bladder cannot be controlled.

Observe color of urine. Understand chemistry of urine – ammonia, nitrogen and hydrogen.

What happens if bladder is not emptied frequently? Infection. There is bacteria in urine. If not excreted, urine backs up from the bladder.

Conclusions:

1. Drink water. Is it possible to drink too much water? Not usually.

2. Move muscles – pushes fluids along in body.

3. Balance of salts is important. Too much salts in body – body holds on to water. Not enough salt – you lose water, or dehydrate. Salts in the body: sodium salts, calcium salts, potassium salts (in old people the balance goes down).

RELEVANT PHYSIOLOGY OF DISABILITY
MUSCULAR DYSTROPHY – DUCHENNE TYPE
Childhood Pseudohypertrophy

Problem: Progressive wasting of muscles which causes a gradual weakening.

Relevant Physiology:

1. Normal Muscle Physiology
2. Effect of Muscular Dystrophy
   - A. Initial Involvement
   - B. Distinctive Characteristics
   - C. Progression
3. Hereditary Aspects
4. Recent Progress of Treatment
5. Hope for the Future

1. Normal Muscle Physiology:

A muscle is a tissue made of elongated cells capable of contracting when stimulated, and it is also an organ that contracts to produce, enhance, or check a particular movement.

2. Effect of Muscular Dystrophy:

A. Initial Involvement:

Involvement of the proximal muscles (located toward the center of the body) of pelvic girdle leads to a defect in the posture (lordosis), a peculiar gait (waddling type) and difficulty in going up stairs or getting up from the floor. The next group of muscles affected are the shoulder girdle.

B. Distinctive Characteristics:

Because the wasted muscle tissue is replaced by increased deposits of fat; enlargement of the calf muscle is apparent. This is called pseudo-hypertrophy.

C. Progression:

Onset is usually between ages 2 and 6. The progress is rapid. However, there are several distinct stages of progression outlined in the Introduction of the Physical Health Module. The Duchenne type is the most common and severe, and death usually occurs within 10 to 15 years after the onset of symptoms.

3. Hereditary Aspects:

The hereditary pattern of Duchenne Muscular Dystrophy is recessive sex-linked, transmitted through the female and affecting predominantly male children. Up to 50% of the male children may develop the disease while 50% of the female children may be the carriers of the defective genes.

4. Recent Progress of Treatment:

1. Antibiotics help control respiratory infections.
2. Wearing of a molded plastic sitting corset will help to delay the rapid development of scoliosis (curvature of the spine).
3. Prevention of a curvature for as long as possible will also delay development of complications caused by organs being displaced by the curve; respiratory and cardiac embarrassment can occur by the organ displacement.

4. Bracing of the lower extremities, surgical procedures on the heelcord, and transplanting of tibial dorsum muscle will prevent foot deformities and allow for a longer period of ambulation. It is also much easier to fit a shoe on a foot which remains in a normal functioning position.
5. Physical therapy is helpful in the earlier stages and will prevent contractures in the joints, but has a minimal effect upon the course of the disease.

5. Hope for the Future:

1. Early differential diagnosis can be crucial.
2. Identifying the carriers.

RELEVANT PHYSIOLOGY OF DISABILITY ARTHROGRYPOSIS MULTIPLEX CONGENITA

Problem: Joint immobility

Relevant Physiology:

1. Physiology of Joint Muscles
2. How Arthrogryposis Affects Muscle Fibers
3. Cause
4. Recent Progress or Treatment
5. Hereditary Aspects

1. Physiology of Normal Joint Muscles:

The skeletal muscles that move joints on the trunk and limbs are always arranged in pairs. Muscles that bend joints are called flexors, while those that straighten them are called extensors.

Even when a joint is not being moved, flexor and extensor muscles oppose each other in a state of slight contraction called tone.

2. How Arthrogryposis Affects Muscle Fibers:

Muscle fibers are infiltrated and replaced with fibrous and fatty tissue. Joints become rigid. All extremities, or one, may be involved. (Occurs more often in males than females.)

3. Cause:

The cause is unknown. The condition occurs during fetal life. The contractures are due to shortening of flexor muscles. The muscle fibers diminish in size and number. The decreased muscle mass in the advanced stages causes limbs to look spindly and joints to look fusiform (large).

Muscle fiber is almost lacking in the advanced stage, having been replaced by collagenous tissue and fat.

4. Recent Progress or Treatment:

Soft tissue releases may permit a more functional position of the joints, but permanent functional disability is usual and may be severe in those with widespread involvement.

5. Hereditary Aspects:

None apparent.

RELEVANT PHYSIOLOGY OF DISABILITY RHEUMATOID ARTHRITIS

Problems: Joints are stiff and painful, causing limitation in movement.

Definition:

Arthritis is a systemic disease of the connective tissue throughout the body, especially the muscles and joints, and is evidenced by inflammation of the joints. It begins with an inflammation in the membranes (inflammatory synovitis) of the affected joint, which becomes roughened, granular, and swollen. Motion of the joint is often limited by swelling and muscle spasm. If the inflammation continues, erosion of the joint cartilage occurs. Only a small percentage of victims of rheumatoid arthritis are children. Most children who develop rheumatoid arthritis (Still's Disease) do so before the age of seven. First symptoms may occur in knee or other joints. Early signs may include high fever accompanied by a salmon-pink rash which may last for weeks or months. There are recurrent remissions and exacerbations until puberty. Exacerbations may occur in adult life.

Cause – unknown.

Relevant Physiology of joint:

Wherever two bones move on one another, the ends of the bones are covered with smooth, slippery cartilage which reduces friction. The bearing surfaces are completely enclosed in a liquid-tight capsule made of ligaments (tough strands of connective tissue) and the joint cavity is filled with a liquid lubricant (synovial fluid) secreted by the membrane lining of the cavity. This liquid is similar to lymph or tissue fluid, but contains a small amount of mucus.

RELEVANT PHYSIOLOGY OF DISABILITY
CONGENITAL AMPUTEES & LIMB DEFORMITIES

Problem – Absence of one or more limbs

1. Definitions
2. Relevant Physiology
3. Causes

1. Definitions:

Amelia – total absence of an extremity
Abrachia – absence of arm
Hemibrachia – absence of forearm and hand
Acheiria – absence of hand
Adactyly – absence of digits
Ectradactyly – absence of phalanges
Phocomelia – absence of a structure with retention of remaining extremity (seal limbs or flippers) reached epidemic proportions in 1957 in Germany, Great Britain, Italy, Sweden, etc. In 1961 Lenz showed it was due to thalidomide, sold as a sedative and antiemetic – injures embryo between 28th and 42nd days after conception.

2. Relevant Physiology:

Bone is living tissue which requires adequate nutrition and activity for normal growth and performance of its functions. It changes constantly in response to growth, functional demands, stress, injury, or illness. Bones as well as muscles are subject to atrophy from disuse; this fortunately is a reversible process. Deformities develop when part of a bone or the entire bone is not present.

Normal body alignment and function are closely associated. For instance, absence of the tibia or a part of the femur prevent normal weight bearing so that in addition to distortion in body alignment, bone atrophy will occur because of inactivity. Knowledge of such consequences explains the importance of early use of appliances to aid in good body alignment and to make possible weight bearing and locomotion which stimulate bone growth and prevent atrophy and secondary deformities.

3. Causes:

Today we know that formation of limbs can be suppressed by genetic or by environmental factors. Genetic mechanisms are surely at work in families and kindreds that contain multiple cases sometimes distributed over several generations. Environmental causation was amply demonstrated by the thalidomide epidemic.

The anlage (development) of an organ is more susceptible to environmental stress during the period of its rapid growth. Ingalls showed that certain anomalies of the upper limb result from stress during gestation: absence of arm occurs if stress is applied in the third and fourth week of gestation, carpal absence if in fifth and sixth weeks, and digital stunting if in eight week.

It is less known that reduction malformations are sometimes due to chromosome anomalies and that they can occur as constituents of syndromes of cytogenetic origin.

BACKGROUND INFORMATION 7-12

RELEVANT PHYSIOLOGY OF DISABILITY
OSTEOGENESIS IMPERFECTA CONGENITA

Problem: Bones fracture very easily.

Relevant Physiology: Physiology of bones

1. What makes bones fracture?
2. Differences in structure
3. How fracturing affects growth
4. Hereditary aspects
5. Causes
6. Positive help
7. Definitions

1. What Makes Bones Fracture?

Inability of the system to produce normal and adequate osteoid (bone cell material), collagen (gelatin-like protein), dentin (calcium material).

Body doesn't produce substances for the bone forming cells (osteoblasts) and fiber forming cells (fibroblasts). This results in fragility of bones.

2. How Are Osteogenesis Imperfecta Bones Different in Structure?

Bones are usually of normal length but their diameter is smaller, so they are thinner and inadequately formed to resist normal stress.

Because of inability of body to produce osteoid, collagen, skeletal muscles are also poorly developed.

Bone cells remain alive and secrete a bony matrix throughout life. Matrix contains calcium salts (hydrosyapatite) and proteins, principally collagen.

Calcium salts in bony matrix make it very hard and collagen prevents the bones from being overly brittle.

Bone not a solid structure. Cavity – marrow. Running through matrix of bone are channels (Haversian canals) in which lie blood vessels and nerves to supply and control bone cells.

At first embryo's skeleton is almost entirely of cartilage. After about second month of uterine development, certain of the cartilage cells disappear and are replaced by bone cells. Such cells remove calcium phosphate and calcium carbonate from the blood and deposit these minerals to form the bone structure. This process is called ossification.

Since ossification involves deposit of calcium compounds between the bone cells, it results in an increase in the strength of the bone.

The Structure of a Normal Bone

If a long bone, such as a bone from the leg or thigh, is cut lengthwise, several distinct regions can be seen. The outer covering is a tough membrane called the periosteum. This membrane aids in nourishing the bone (because of its rich blood supply) and in repairing injuries; it also provides a surface to which muscles are attached. Beneath the periosteum is a bony layer containing the deposits of mineral matter. This layer varies in hardness from an extremely hard material in the middle region to a porous and spongy material at the ends. The bony layer is penetrated by numerous channels, the Haversian canals, which form a network extending throughout the region. These canals carry nourishment to the living cells of the bony layer through blood vessels that connect with those of the outer membrane.

Many bones have hollow interiors and contain a soft tissue called marrow. The marrow is richly supplied with nerves and blood vessels. There are two distinct types of marrow. The red marrow is found in flat bones such as the ribs and sternum, as well as in the ends of long bones and vertebrae. It is active in forming the red corpuscles and most of the white corpuscles of the blood. The yellow marrow fills the central cavity of long bones and extends into the Haversian canals of the bony layer. It is normally inactive and primarily composed of fat cells but may produce corpuscles in time of great blood loss and in certain blood diseases.

The smaller bones are solid rather than hollow and vary considerably in the amount of spongy bone tissue present. Although they are solid, they are completely penetrated with blood vessels.

BACKGROUND INFORMATION 7-12

3. How Does Fracturing Affect Growth?

Subnormal stature may result from interference with length growth by multiple small fractures in the metaphysis. Ordinary activity may cause partial fractures which eventually may result in bending – (more obvious in lower extremities probably because they are more vulnerable to trauma). If fractures are numerous, child may appear not to be growing, since overriding (overlapping of ends of fractured bones) and bending cause loss in stature.

4. Hereditary Aspect

Fifty per cent have dominant trait family history with complete syndrome of several features in less than half the cases. May occur as spontaneous mutation – then only that child will have Osteogenesis Imperfecta children.

5. Causes

Osteogenesis Imperfecta now appears to be a systemic inability to produce normal and adequate osteoid, dentin and collagen in sufficient amounts to balance the concomitant bone lysis (disintegration). This inability is registered in the skeleton, the teeth, the sclera, the joints, the skin, and the blood vessels.

At the time of cessation of normal skeletal growth, the severity of the condition may subside.

Result is a patient with a fragile skeleton, thin skin a .d blue sclera of the eyes, poor teeth, a tendency to macular bleeding and hypermotility of joints.

One authority explains Osteogenesis Imperfecta as the inability of cells that normally elaborate osteoid and collagen to synthesize the normal amino acid constituents of these substances.

6. Treatment

A surgical procedure can be done to add strength to the long bones. This is called "rodding". The rods have a telescoping ability and will increase in length as the bone grows. The rods are often of a plastic material. (They can slip out of the bone and this requires another hospitalization to replace the rod).

7. Definitions

Collagen – a gelatin-like protein occuring in vertebrates – the chief constituent of the fibrils of connective tissue and of the bones.

Dentin – a calcareous material which composes main part of tooth.

Calcareous – calcium carbonate – lime.

RELEVANT PHYSIOLOGY OF DISABILITY
ACHONDROPLASIA

Problem – Small Stature

1. Why growth is hampered
2. Background information
3. Cause
4. Hereditary Aspects
5. Recent Progress

1. Why growth is hampered:

Imperfect ossification within cartilage of long bones, beginning in fetal life, produces dwarfism. Dwarfism is due largely to shortening of extremities, with proximal bones affected. Head is normal in size.

Premature union of the epiphyses of the long bones; longitudinal growth is cut short. Bones have normal density.

Disturbance in the epiphyseal (ends of long bones), chondroblastic (cartilage cell) growth and maturation causes inadequate enchondral (long) bone growth.

Some ossification areas appear to be affected more than others, particularly those at the base of the skull and the ends of the long bones.

Because only enchondral bone growth is affected there is less inhibition of trunk growth than of that of the extremities.

Fifty inches is the usual height. All of the long bones are widened at the ends.

BACKGROUND INFORMATION 7-12

Iluim is shortened, especially in caudal segment of wing and body below posterior-inferior iliac spine; greater sciatic notches are reduced to narrow, deep clefts; excessive cartilage is present in the lumbar spine.

The brain is obliged to grow upwards and forward because of the short base (of the skull which may ossify in utero or early infancy), resulting in a characteristic bulging of the forehead and bossing of the frontal bones.

Relatively normal growth of mandible makes it look relatively large.

Vertebral column may achieve normal length but vertebral development is usually not normal. Lordosis is usual.

Long cylindrical bones of the extremities, depending entirely upon enchondral growth for their length, are the most dramatically altered. Their finger tips reach only to the hip joint instead of mid thigh region and patient has a duck-legged appearance. Legs are frequently bowed. Fingers are stubby.

2. Background Information:

In the early stages of the development of human embryo, the skeleton is composed almost entirely of cartilage.

After about the second month of development certain cells disappear and are replaced by bone cells.

Achondroplasia is a Cartilaginous Dysplasia related to abnormal maturation of growth plate chondroblasts.

Actual knowledge of the disease-related morbid physiology of these dysplasias is lacking. It appears that a disturbance in division and maturation of growth plate chondroblasts, resulting in a deficit of chondroid lattice, inhibits normal enchondral growth of long bones characterized by micromelia and relatively normal trunk and small limbs skeletons.

Ossification – Cartilage cells remove calcium phosphate and calcium carbonate from the blood and deposit these minerals to form the bone structure. The length growth of cylindrical bones comes about through enchondral bone formation and the width growth comes about through intramembranous ossification.

In developmental disturbances such as anchondroplasia, intramembranous bone formation is normal, but because there is faulty cartilage production normal progression in the steps in enchondral ossification is interrupted.

Since effects of stress are compromised it's difficult to determine exact point at which physiologic chain of events is broken.

The time of closure for each epiphysis is specific.

3. Causes:

Cause of inadequate cartilage development is entirely unknown. (Not caused by disturbed function of the pituitary, thyroid or any other ductless gland.) Now classified as a germ plasm defect probably caused by abnormal genetic components. Lack of response to vitamin A.

It affects all of the bones of enchondral formation but most marked in the long bones, spine and pelvis. (Spine and pelvis deformities are constant.) Fault is not in osteoblastic activity but the scaffolding is so irregular and sparse that little osteoid can be laid down in a systematic fashion.

4. Hereditary Aspects:

Simple Mendelian dominant and fertility is not affected. Also many sporadic cases, probably resulting from mutations – affected individual with normal parents (therefore presumably a new mutation) has a 50% chance of transmitting the disease to his children.

Achondroplastic women almost never produce viable offspring via normal birth canal. They can deliver only by Caesarean section.

(Accurate diagnosis may not be possible until the patient is 6 months old.)

5. Recent Progress:

No treatment available – Those who survive first year have normal life expectancy.

BACKGROUND INFORMATION 7-12

RELEVANT PHYSIOLOGY OF DISABILITY
CONGENITAL CARDIAC DEFECTS

Problem: Poor circulation – underdeveloped child – easily fatigued.

1. Structure of the Heart
2. Various Defects in the Heart That Cause Disorders
3. Why Some Have Cyanosis
4. How Circulation is Affected by Heart Defects
5. Hereditary Aspects
6. Causes

1. Structure of the Heart:

The heart is a fist-sized, four-chambered pump which contracts and relaxes more than 100,000 times a day, during which it pumps about 4,300 gallons of blood through 60,000 miles of arteries, veins, and capillaries.

The heart is a cone-shaped, muscular organ situated under the breastbone and between the lungs. It is enclosed in a sac called the pericardium. It usually lies a little to the left of the midline of the chest cavity, with its point extending downward and to the left between the fifth and sixth ribs. Since the beat is strongest near the tip, many people have the mistaken idea that the entire heart is on the left side.

The heart is composed of two sides, right and left. The two halves are entirely separated by a wall called the septum. Each half is composed of two chambers, a relatively thin-walled atrium and a thick, muscular ventricle. The two atria act as reservoirs for the blood entering the heart. Both contract at the same time, filling the two ventricles rapidly. Next, the thick, muscular walls of the ventricles contract, forcing the blood out through the great arteries.

Flow of blood from the ventricles under pressure, and maintenance of pressure in the arteries between beats, require two sets of one-way heart valves. The valves between the atria and ventricles are called the atrio-ventricular valves, or a-v valves. They are flaplike structures that are anchored to the floor of the ventricles by tendonlike strands. Blood passes freely through these valves into the ventricles. The valve cannot be opened from the lower side, however, because of the tendons anchoring them. Thus, blood is unable to flow back.

2. Various Defects in the Heart That Causes Disorders:

There are thirty-five recognized types of congenital heart malformations in the structure of the heart and of the large blood vessels near the heart. Most can be corrected or alleviated by surgery.

Some common defects are:

Ventricular Septal Defect – hole between two large pumping chambers of the heart.

Atrial Septal Defect – hole between two upper chambers.

Patent Persistent Ductus Arteriosus – fetal duct between aorta and pulmonary artery which usually closes at birth doesn't.

Pulmonary Stenosis – narrowing of pulmonary valve, obstructing blood flow from heart to lung.

Aortic Stenosis – narrowing of aortic valve obstructing flow from heart to rest of the body.

Coarctation of Aorta – constriction of aorta, main artery conducting blood from heart to the body.

Tetralogy of Fallot – four defects usually occuring together: pulmonary stenosis, dextraposed aorta, ventricular septal defect, and hypertrophy of the right ventricle.

3. Why Some Have Cyanosis:

Cyanosis is a lack of oxygen in the blood which causes skin to take on a bluish cast especially around lips and nail beds. Some of the blood from the veins goes directly into the left side of the heart and is pumped throughout the body again without ever reaching the lungs to pick-up oxygen.

BACKGROUND INFORMATION 7-12

4. How Circulation is Affected By Heart Defects:

The blood in the circulatory system carries oxygen and nourishment to the muscles and organs of the body, and carries away carbon dioxide, water, and wastes.

The normal heart muscle pumps this blood continuously day and night by a regular series of contractions and relaxations. When the body is at rest, the heart pumps about ten and a half pints of blood per minute – (The body contains about 12 pints of blood. All the blood makes a complete circulation through the body in slightly over a minute.) Mild exercise speeds the heart output to about twenty pints per minute, and strenuous exercise may increase it to forty-two pints per minute. The heart weighs only a quarter of a pound.

If the heart is not able to pump a sufficient amount of blood containing oxygen and nutrients to the organs and to the brain, they are undernourished. Without sufficient oxygen and nourishment the body is fatigued and susceptible to infection.

5. Hereditary Aspects:

The number of cardiac defects caused by faulty genes is unknown.

6. Causes:

Defects are sometimes associated with a maternal history of virus infections, vitamin deficiencies, or excessive exposure to radiation.

RELEVANT PHYSIOLOGY OF DISABILITY
HEMOPHILIA

Problem: When bleeding occurs it cannot always be controlled.

Relevant Physiology:

Definition
Why Bleeding does not Stop
What Factors are in the Blood
How Blood Clots
Hereditary Aspects
Treatment

Definition:

Hemophilia is a hereditary disorder which results from a deficiency of either of two blood proteins which are vital clotting factors of the blood.

Why Bleeding does not Stop:

Clotting disorders occur because of a decrease or absence of one or more of the principally protein substances in the plasma called "clotting factors."

What Factors are in the Blood:

I. Fibrinogen
II. Prothrombin
III. Thromboplastin
IV. Calcium
V. Labile Factor
VI. This number has never been assigned
VII. Stabile Factor
VIII. Hemophilia A, Classical Hemophiliac Factor, anti-hemophiliac globulin (AHG)
IX. Hemophilia B, Christmas Disease Factor, plasma thromboplastin component (PTC)
X. Stuart-Prower Factor
XI. Rosenthal Factor, plasma thromboplastin antecedent (PTA)
XII. Hageman Factor
XIII. Laki-Loran Factor, Fibrin Stabilizing Factor (FSF)

Within the congenital clotting disorders, over 90% have a decrease or lack of factor VIII, or IX. Ten times as many lack factor VIII as lack IX. (Those with won Willebrand's disease have subnormal factor VIII which produces clotting abnormality and also a prolonged bleeding time related to impaired ability of platelets to stick to various surfaces. This disease is passed equally to both men and women and is a dominant form of inheritance.) Other inherited clotting deficiencies make up the remaining 15% and include hemophilia C, lacking Factor XI, von Willenbrand's disease – often called pseudo-hemophilia – platelet dysfunctions, and other relatively rare inherited coagulation disorders.

BACKGROUND INFORMATION 7-12

How Blood Clots:

Clotting results from the chemical and physical changes in the blood. When blood leaves a vessel, the platelets disintegrate and release thromboplastin. This substance reacts with prothrombin and with calcium to form thrombin. The thrombin changes to fibrinogen, a blood protein, to fibrin. The tiny threads of fibrin form a network that traps blood cells, thus forming a clot, and preventing further escape of blood. These trapped corpuscles dry out and form a scab. Healing takes place as the edges of the wound grow toward the center. If any of the substances mentioned above are not present clotting will not occur.

Background Information on Problems Created by Bleeding:

The most frequent site of bleeding (over 80%) is into muscles and joints. Bleeding into joints can result in painful limitation of motion and deformity. Then the capsule surrounding the joint, which is tough fibrous tissue, confines blood within the joint space. The red blood cells within the joint are broken down by chemical reactions and the lining tissue, the synovium (inflammation of the joint lining), starts to rid the joint of these blood products (by reabsorbing them). If bleeding is not stopped, the synovium cannot remove the blood from the joints quickly enough. Undesirable blood clots remain within the joint and contribute to destruction of joint cartilage. Normal cartilage is very smooth substance that covers the bone within a joint. If it is damaged it loses its smooth surface and becomes irregular. If two irregular surfaces rub against each other, a situation similar to sandpaper rubbing against sandpaper develops. This accounts for the pain and decreased mobility in the joints of many hemophiliacs. Since cartilage has only a limited ability to repair itself, early treatment before irreversible changes occur is essential. Bleeding into muscles: blood which has escaped is broken down through a series of chemical reactions into bilirubin (red bile) and biliverdin (green bile) which account for the changing colors that are noted when a collection of blood or hematoma, resorbs. A large hematoma is usually associated with some local tissue destruction so that after it resorbs a scar will be left within the muscle. As the scar is formed the surrounding tissue contracts causing the muscle to shorten and the joint it controls to remain flexed. This is flexion contracture. To avoid this bleeding into the muscle it must be treated promptly. Muscle bleeding similar to joint bleeding must be treated with prompt replacement therapy and immobilization.

Heredity:

Hemophilia is inherited as a sex-linked recessive gene; therefore, except for rare instances, only males are affected. Only females – all the daughters and about half the sisters are carriers. If hemophiliac marries normal woman – all sons of hemophiliacs (men) are normal and do not pass it on. All daughters of hemophiliacs are carriers. If carrier marries normal man impossible to predict how many sons of carriers will have hemophilia or how many daughters of carriers will be carriers – but theoretically half of the sons would have hemophilia and half the daughters would be carriers. A mutation has been estimated to account for approximately 1/4 of the newly discovered cases of hemophilia. A new method involving the direct measurement of the clotting substance is being used to try to identify a carrier. Factor activity of approximately 50% identifies a carrier of hemophilia.

Treatment:

Late in 1970 doctors reported that successful procedures had been developed for home injection of the clotting factor. The objectives of treatment are prevention of deformity during the acute phase of hemarthrosis, promotion of resolution of the hemorrhage and protection against joint trauma and subsequent episodes of hemorrhage. In the *acute phase* daily passive range of motion exercise to prevent formation of contractures and traction, posterior splints or other methods for immobilization between exercise sessions are prescribed. Ultrasound may be helpful in speeding resolution of the hematoma. *Interim treatment* consists of range of motion exercises to restore full normal joint mobility if contractures have developed, repetitive and resistive exercises to maintain or restore maximal power to the muscles about the joint to assure the greatest degree of stability and protection of joints against avoidable trauma by restriction of physical activity, external support with bracing, energy-saving devices and so forth.

Anti-hemophilic Factor (Human) AHF (2010 mgms protein and 1449 mgms fibrinogen). The (AHF) is being used now by certain hemophiliacs for home injections whenever they experience a bleeding episode. This has also been used by a student at the Human Resources School during his school days ('75-'76).

Important names in Hemophilia Research – dedicated lives to perfecting concentrates:

1940 Dr. K. Brinkhous demonstrated presence of Factor VIII in plasma

1965 Judith Pool – discovery of cryoprecipitate

Dr. Murray Thelin – a hemophiliac who specialized in blood chemistry and dedicated his life to perfecting concentrates. Tested and proved his new powdered concentrate on himself.

Dr. Wagner

Dr. Shanbrom

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NEW YORK STATE CURRICULUM TOPICS

The following are the topics covered in the New York State Curriculum (See ERIC # ED 070 993) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Health Status
Grades K-3

I. Measuring Our Health
- A. Importance
- B. School health appraisal
- C. Vision and hearing
- D. Body growth
- E. How we feel
- F. Total fitness
  - 1. Physical
  - 2. Emotional
  - 3. Social

II. Getting To Know the School Health Team
- A. Your teacher
- B. School nurse-teacher
- C. School physician
- D. Dental health teacher
- E. Psychologist

III. Others Interested in Health (Community)
- A. Family doctor
- B. Public health workers
  - 1. Health department

IV. Keeping Well and Happy
- A. Foods for health and growth
- B. Body activity
- C. Posture
  - 1. Standing
  - 2. Sitting
  - 3. Importance
- D. Social skills
- E. Be safe
- F. Time to sleep, rest, and relax
- G. Caring for our feet

The following are the topics covered in the New York State Curriculum (See ERIC # ED 072 376) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Health Status

Grades 4-6

I. Observing Signs of Positive Health
- A. Responsibility to self and others
- B. Role of health personnel
  - 1. Health service staff
    - a. Physician
    - b. School nurse-teacher
    - c. Dental hygiene teacher
  - 2. Other school personnel
- C. Measurement and evaluation of health status and fitness
  - 1. Health examination
  - 2. Kinds of tests and evaluations
    - a. Vision and hearing screening
    - b. Dental screening
    - c. Physical fitness tests
  - 3. Evaluating daily living (checklist)

II. A Health Spectrum – In Perspective: Planning for "total" fitness in our lives
- A. Good nutrition
- B. Balanced program of sleep, rest, and relaxation
- C. Developing good posture
- D. Caring for the feet
- E. Caring for the skin and its appendages (hair, nails)
  - 1. Skin
  - 2. Hair
  - 3. Nails

III. Other Factors Influencing Health

The following are the topics covered in the New York State Curriculum (See ERIC # ED 036 832) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Health Status

Grades 7, 8, 9

I. The Promotion of Maintenance of Health
   - A. Factors which influence health status
   - B. A concept of fitness

II. Measurement of Evaluation of Health Status
   - A. Health examination
   - B. Pulse rate tests

III. The Health of American People
   - A. Factors which influence population
   - B. Present health status of the American People

Modules in

Nutrition

Nutrition K-6

Special Topics in This Module	Objectives
I. Importance of Breakfast	Learn to eat different kinds of nutritious breakfasts.
II. Nutritious Meals and Snacks	Eat nutritious meals and snacks.
III. Nutritional Activities Based on Special Needs	Learn nutritional activities based on your special needs:
A. Weight Control	Weight control.
B. Small Appetites	Small appetites.
C. Limited Muscle Power	Limited muscle power.
D. Bowel Problems	Bowel problems.
E. Less Salt	Less salt.
F. More Salt	More salt.
G. Increased fluids	Increased fluids.
IV. Science Activities and Nutrition	Learn about nutrition through Science Activities.

BACKGROUND INFORMATION K-6

I. Importance of Breakfast

General – In the morning, time and effort are expended by the parents and students in bathing, dressing, and putting on braces or appliances in time for the arrival of the bus. Limited time and energy, and poor eating habits often result in inadequate breakfasts for physically disabled children. Therefore, the importance of a nutritious breakfast became the focus of an educational campaign for both the parents and the students at Human Resources School. The emphasis was on non-traditional, easy-to-serve foods for breakfasts.

The arrangements for the breakfasts given by the physically disabled students at Human Resources School were:

Involvement of Parents –

Because of the need of involvement of parents, class mothers were invited for refreshments and enlisted as liaisons for contacting parents and arranging for transportation if it was needed. They were given a class list with telephone numbers and addresses and a deadline for reporting back.

Student Invitations –

As a reinforcement, students made invitations for their parents and brought them home with a request for an answer.

A trip to the store to buy the ingredients was an experience in independence as well as arithmetic.

Choosing guest speakers and writing invitations to them became a language arts lesson.

Science –

Science lessons included nutritious, balanced meals from the four food groups, the meaning of calories, selecting the menus, and the importance of a healthful breakfast.

Working in the Home Ec lab students prepared home-baked oatmeal bread and granola made from all-natural ingredients.

During their art period the students prepared creative placemats which were collages of magazine pictures of the four food groups.

The breakfast menus included cheese and peanut butter served separately on slices of home-made bread, fresh fruit sections, juice, milk, and granola. The foods were prepared in the morning at school before the parents arrived.

The parents were the guests of the children.

During and after the breakfast, a short workshop was given to the parents about the basic food groups, and ideas for non-traditional but nutritious breakfasts were exchanged. Parents were informed by the school nurse-teacher of the special need of disabled students for balanced, nutritious meals in order to maintain as healthy a body as possible. Parents were also informed by the science teacher of the following science-health projects:

- Weighing and measuring all students
- Converting individual weights and measurements to the metric system
- Research projects on the history of a favorite food
- Experiments which explained the concept of calories and the use of a calorimeter
- Building of models of the systems of the body

List of nutritious snacks compiled by the school health team was distributed and discussed by the health team.

See snack list with activities on Nutritious Meals and Snacks.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
I. Importance of Breakfast **Objective:** Learn to eat different kinds of nutritious breakfasts. 1. Breakfast is a very important meal because it can supply energy and help to maintain as healthy a body as is possible for a physically disabled child.	1. Write several original breakfast menus that will make breakfast a new and exciting meal. 2. Prepare charts, posters, and placemats to show that breakfast can consist of any nutritious foods taken from the basic four food groups.	1. Give a non-traditional breakfast for your parents. Combine projects for the breakfast with your other subjects. For example: **Language arts** – write invitations **Art** – design placemats and posters **Science** – learn the nutritional value of all the foods you would like to use **Arithmetic** – Make a budget for buying the food **Home Economics** – Prepare the food and serve it

II. Nutritious Meals and Snacks

General – Because of repeated hospitalizations, special diets, parents' anxiety, poor appetities, medication, etc. finicky eating habits may have developed. It is important to encourage these students to try a wide variety of nutritious foods in order to develop a habit of eating a balanced diet. The inclusion of "convenience" snacks, processed foods and candy in school lunches makes a campaign for nutritious, low-calorie snacks and balanced lunches another important goal for physically disabled students.

Students who would be especially endangered by infections include those with the following disabilities:

1. Dysautonomia
2. Spina Bifida
3. Muscular Dystrophy
8. Congenital Cardiac Conditions

Special Considerations regarding nutritious meals and snacks:

1. **Dysautonomia** – They often have feeding problems in infancy, difficulty in swallowing and lack of taste buds. Not only from poor nutrition but in general they have slow growth and slow weight gain. May be finicky eaters. May gag when eating. If a meal is missed, nutrients should be balanced out during the day. Often a bland diet is recommended for these children.

6. **Osteogenesis Imperfecta** – Since these children tend to be very small they should understand that although good nutrition will not cause extraordinary growth, it should help overall development and feelings of well-being.

8. **Congenital Cardiac Conditions** – Many are finicky eaters (because mothers have been told not to let them cry). Not as well-nourished because of the whole circulatory system, so wholesome, nutritious diet is very important and requires ingenuity on the parents' part. Susceptible to colds and respiratory infections. Good nourishment might help keep up their resistance to infections.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
II. Nutritious Meals and Snacks **Objective:** Eat nutritious meals and snacks.		
1. Well-balanced, nutritious meals and snacks are doubly important for physically disabled students to increase their resistance to infection and hasten the healing process – ie: post-operatively. A well-balanced meal includes a selection from each of the basic four food groups: a. Milk – dairy products b. Meat – fish – poultry c. Breads – cereals – grain d. Fruits and vegetables	1. Ask help from your classroom teacher or school nurse-teacher in learning about the basic requirements for a nutritious, well balanced diet. 2. Check with your doctor for any special dietary needs you might have. 3. Plan a week of meals for yourself, having your mother check for cost and preparation time. (A Home Ec teacher could help estimate these too.) 4. Plan to choose your snacks from the following list to improve your nutrition, cut down on sugars and processed cakes, and avoid "empty calories."	1. Have a "tasting party" to introduce the class to new varieties of foods (e.g., seeds, cheeses, nuts, etc.). 3A. Follow your weekly menu plan noting how you feel each day. (tired, alert, weak, strong, etc.) 3B. Check with your doctor at your next visit to see if you have had fewer infections since your dietary change.

SUGGESTED FOODS FOR SNACK TIME

	Portion	Approximate Calories
VEGETABLES:		
Celery sticks	2 sticks	15
Raw Cauliflower	¼ head	25
Raw Broccoli	1 stalk (5½")	33
Cucumber sticks	½ medium	10
Green & Red Peppers	1 medium	20
Raw String Beans	½ cup	25
Radishes	5	10
Carrot Sticks	1 carrot	20 per carrot
FRUITS:		
Apple	1 large	100
Pear	1 medium	50
Peach	1 medium	50
Raisins	½ cup	90
Orange	1 medium	80
Nectarine	1 medium	60
Plums	2 medium	50
Grapes	1 bundle (seedless)	75
Strawberries	1 cup	90
Cantaloupe	½ medium size	50
Prunes	4 dried	100
Bananas	1 medium	90
Tangarines	1 medium	60
Blueberries – fresh	1 cup	90
JUICES:		
Tomato Juice	1 cup	60
Cranberry Juice		
Orange Juice	1 cup	125
Grapefruit Juice (unsweetened)	1 cup	100

SPREADS:		
Peanut Butter	½ tablespoon	90
CHEESE AND EGGS:		
American Cheddar	1 cube (1-1/8" sq.)	110
Cottage Cheese (not creamed)	5 Tablespoons	100
Yogurt – plain	1 cup	120
Hard boiled egg	1	75
CRACKERS:		
Melba Toast	1 square	20
Graham Cracker	1 square	35
Saltines	1 square (2x2)	15
SEEDS AND NUTS		
Peanuts – shelled	10	100
Cashews	4-5	100
Pecans	6	100
Walnuts	8	100
Almonds	12-15	100
Hickory	12-15	100
Pumpkin Seeds		
Sunflower Seeds		
MISCELLANEOUS:		
Popcorn	1½ cups	10C
Pretzel Stix		

III. Nutritional Activities Based on Special Needs

A. Weight Control

2. Spina Bifida – These children need to be careful of caloric intake. Gain weight quickly from immobility. If ambulatory – should be careful of calories too. They do not burn up as many calories as if they were running around. Avoid between-meal snacks and sweets. Immobility necessitates reduced caloric intake. Support and encourage good eating habits. Normal growth will cause weight gain which is not detrimental.

3. Muscular Dystrophy – While ambulatory – good nutrition is important. As they become less active, take into account the need for altering quantities of food. Obesity is partly a result of the disease. As muscle wastes, it is replaced by fatty material. Because of muscle weakness, a curvature of the spine occurs and the internal organs have less room. Muscles of masticulation become weaker and more effort for chewing and swallowing is required. Time taken to eat is longer.

4. Arthrogryposis – Obesity would make ambulation and mobility more difficult.

Rheumatoid Arthritis – No such thing as a special arthritis diet. Good balanced diet from the basic food groups helps to build up a resistance to the wear and tear brought on by arthritis. Extra pounds can mean an extra burden on weight-bearing joints – which would increase pain and strain. Also, when in pain, an arthritic exercises less and may put more weight on. Reduction diet should still be based on the four food groups.

5. Congenital Amputee – Be careful of weight. Well-balanced diet.

6. Osteogenesis Imperfecta – Obesity can develop if immobile.

7. Achondroplasia – Balanced smaller portions – normal nutrition.

9. Hemophilia – Increase in weight will not be a pad against injury and puts more strain on knee and ankle joints. Between-meal sweets should be restricted because less activity may increase weight.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
III. Nutritional Activities Based on Special Needs **A. Weight Control** **Objective:** Learn nutritional activities based on your need for weight control. 1. Weight control is especially important: (a) for wheelchair-bound students in order that children can move about as much as possible and be able to transfer in to and out of the wheelchair; (b) for those with joint involvement, because excessive weight makes mobility more difficult.	1. Check with your doctor or school nurse to see if your weight is correct for your age and height. Depending on whether you should maintain present weight or reduce, have them help you determine the number of calories you need for a day. 2. Do library research on basic four food groups and calorie content of standard foods. Then plan a week's meals according to your caloric needs. Check your plans with doctor or school nurse-teacher, as well as your mother. (Food costs may affect your mother's choices). Try to "make the most" of your calories, choosing foods that will work for you rather than those with empty calories.	1. Keep a calorie diary of everything you eat, checking to see how you keep to your calorie limit and how well you provide fuel from the basic four food groups for your body to use. 2. Plan a date several weeks ahead and see if your weight has changed or remained the same according to your goal. (Remember to check height, too, since growth will affect weight patterns.)

B. Small Appetites

General – Many children with a physical disability have a diminished appetite. Eating small frequent meals is indicated.

1. Dysautonomia – Children tend to have a slow growth pattern and slow weight gain. They are not able to eat in the morning because of mucus accumulations and frequent gagging or swallowing difficulties.

3. Muscular Dystrophy – 4. Rheumatoid Arthritis – The appetitie is often diminished. To avoid undernourishment and anemia, eat smaller meals more often. Pay attention to foods that are rich sources of protein and iron.

6. Osteogenesis Imperfecta – 7. Achondroplasia – Since these children tend to be small, they should understand that although good nutrition will not cause extra-ordinary growth, it should help overall development and feelings of well-being.

8. Congenital Cardiac Conditions – Are not as well-nourished because of impairment of the whole circulatory system, so nutrition is very important and requires ingenuity in preparation.

C. Limited Muscle Power

3. Muscular Dystrophy – 4. Arthrogryposis – Weakness or stiffness may make it harder to feed oneself and might tend to limit the kinds and amount of food eaten. Students should be trained to prepare food in easy, efficient ways. They should also learn to budget energy, to select and prepare nutritious convenience foods, and to arrange the kitchen efficiently to make food preparation easier and less tiring.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
B. Small Appetities		
Objective: Learn nutritional activities based on your small appetite.		
1. Good nourishment is very important for those with small appetities.	1. To encourage yourself to eat small meals more often, make a "small portions" recipe note book of foods which are rich in protein and iron. Include tips on how to make small portions look attractive. Make a section for foods from each of the four groups and arrange sample daily eating plans that include some foods from each group.	1. Plan a "small portions" lunch. Prepare and freeze as many different kinds of foods as you can in small containers. Check that there are foods from each of the four food groups.
C. Limited Muscle Power		
Objective: Learn nutritional activities based on your limited muscle power.		
1. Children with limited muscle power can find ways to help themselves.	1. Invite an occupational therapist to class to discuss adaptations in eating utensils that are available.	1. Work out easier ways to prepare foods, choose dishes and utensils for easier eating, like cups with large handles, or utensils with extended handles.

D. Bowel Problems

General – Teacher or SNT should check on notebooks. Monitoring and reinforcement are important for developing a set of desirable behaviors.

Continued follow-up is important in chronic illness.

2. Spina Bifida – Avoid foods that will cause constipation or diarrhea (highly spiced). If these foods are eaten, students must be prepared to cope with results. Fluid intake is important for bowels, too.

3. Muscular Dystrophy – As the disease progresses scoliosis and weak muscles may result in body organs and stomach having less space in the body. Chewing and swallowing may require more effort. They may not have much of an appetite. Eating takes more time. Weakness of muscles and inactivity may result in bowel problems. More attention to foods that help elimination: fresh fruits and vegetables. If needed: juices or cooked prunes. Starchy foods may contribute to constipation.

4. Arthrogryposis – Immobility contributes to constipation.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
D. Bowel Problems **Objective:** Learn nutritional activities for bowel problems.		
1. Bowel problems caused by poor appetite or "finicky" eating habits may be helped by changes in a disabled person's diet.	1. Check a chart of foods from the basic four food groups to see how many basic foods you never eat. 2. Check your eating habits to see if you eat proper amounts from the basic four every day (Your doctor may make some adjustments in quantity or frequency of certain foods.) 3. If you do have problems with bowel function, ask your doctor for suggestions concerning your diet. Make dietary changes, then plan to see or speak to him again in a few weeks.	2. In a notebook – keep your own daily log showing which foods you ate from each food group. 3. Follow your newly formed eating plan, noting changes in bowel function and habits.

E. Less Salt

8. Congenital Cardiac Conditions – May have a salt-restricted diet (if they have a tendency to retain fluids). They may have to limit fluids in each 24 hour period.

F. More Salt and Bland Diet

1. Dysautonomia – Some, because of disturbance in sweat glands, may need salt replenishment. If they feel weak, nervous, or tense they may perspire more and have to replace salt. A bland diet may at some point be recommended. Some foods like corn and celery, are notably difficult to digest and generally not worth the effort.

G. Increased Fluids

2. Spina Bifida – An increased amount of fluid intake is important to promote good kidney function because of neurogenic (paralyzed muscles in) bladder. A neurogenic bladder does not empty completely. Bacteria can develop quickly in non-dilute urine which remains for a longer period of time. Many people with Spina Bifida die because of poor urinary function. Cranberry juice is recommended to keep urine as neutral as possible and help prevent kidney infections. Kidney tissue becomes destroyed or damaged and filtering process isn't as good. They should have three or four glasses of fluid between each meal and liquid at each meal.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
E. Less Salt		
Objective: Learn nutritional activities based on your need for less salt.		
1. Certain disabled people have special dietary needs like lessened salt intake for those with certain cardiac conditions.	1. See your doctor or SNT about your salt intake. Check daily habits to see if you are keeping within the prescribed limit.	
	2. If you tend to consume too much salt, ask for help from a nutritionist or Home Ec teacher in planning meals with low salt content.	2. Follow your adapted eating plans, checking periodically to make sure you are not slipping into bad habits.
F. More Salt and Bland Diet		
Objective: Learn nutritional activities based on your need for more salt.		
1. Certain disabled people have special dietary needs, like increased salt intake and bland diets for those with dysautonomia.	1. See your doctor or SNT about your salt intake. Check daily habits to see if you are meeting the prescribed amounts.	
	2. If you tend to consume too little salt ask for help from a nutritionist or a Home Ec teacher in planning meals with adequate salt content.	2. Follow your new eating plan checking periodically to make sure you aren't slipping into bad habits.
G. Increased Fluids		
Objective: Learn nutritional activities based on your need for increased fluids.		
1. An increased fluid intake will promote better kidney function and decrease likelihood of urinary tract infections.	1. See SNT if you have any questions about how much water or other fluid you need during the day.	1. Record your own daily intake of fluid on a clipboard. Each week make a graph showing the daily amounts you have consumed.
	2. Plan a liquid intake routine to make sure you have all the fluid your body needs during the day. Check with SNT for approval.	2. Follow your liquid intake routine daily.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
IV. Science activities can help us learn more about nutrition.	1. Have a combined Science and Health project and choose one or more of the following activities: 1. Plant seeds – Group I water and Group II no water – compare progress of each group. 2. To develop food appreciation and learn sight and smell relationships, identify two similar textured foods (ex. apple and onion) while blindfolded and holding your nose. 3. All food comes directly or indirectly from green plants. List 35 foods and show how each is related to green plants. 4. Draw a tongue map showing the location of the four basic tastes: salt, sweet, bitter and sour. Then place a small amount of various foods on various areas of the tongue to check. 5. Food is fuel for the body. Burn various kinds of nuts and time the length of burning to show heat and light energy produced by food. Note relation to calories. 6. Learn about origins of various kinds of food we commonly eat. Tell the class about your investigation. 7. Learn about cells – "individual building blocks" of your body – using film strips and microscopes. 8. Test for basic food nutrients – protein, carbohydrate and fat. (fat placed on brown paper leaves a translucent mark, carbohydrates or starch test with iodine (reddish brown) turns blue-black.	1. Have an Inter-class health quiz competition as a culminating activity. 9. Learn about calories and calorimeter – make a simple model to explain (burning nut placed in a tin can immersed in larger container of H_2O). 10. Learn about the process of digestion by building a model of the digestive system.

Nutrition 7-12

Special Topics in This Module	Objectives
I. Good Nutrition During the Teen Years	Use knowledge of nutrition to maintain good health status and resistance to disease or infection and to prepare for adulthood.
II. Independence in Preparation of Nutritious Meals.	Successfully plan a menu, shop, cook, serve, and eat a nutritious meal.

BACKGROUND INFORMATION 7-12

General – Adolescents are preparing themselves for adult roles, perhaps as parents; for living independently; and for maintaining good health. The adolescent who has a physical disability needs a good bank of knowledge about foods, and basic nutritional needs as well as practical experience in the preparation of meals, including the planning, shopping, and cooking of food. Many disabled students will live independently and will require the knowledge for their own use. Others may continue to live with family, or friends, but should be aware of the value of nutritious foods, planning menus, and preparing shopping lists.

Those students who tend to be obese have special problems and need all the nutritional knowledge they can acquire. This includes students with: Spina Bifida, Rheumatoid Arthritis, Muscular Dystrophy, and other conditions which limit the students' mobility.

As part of the Health Education Curriculum for the 12th grade at Human Resources School, a unit on nutrition was included at the request of the students.

The objective was to gain knowledge to live independently and manage one's own shopping, cooking, serving and eating without depending upon the "fast foods" and to use the knowledge of nutrition to maintain good health status and resistance to disease or infection.

The course included some general information regarding concepts of basic nutrition. The students kept a food intake chart for one week. They also had discussions of food likes and dislikes, and obesity and weight control.

The group was divided into two groups and, after preparing their own shopping list, did the shopping as well as checking the prices in the particular store they went to. Then they compared prices after the shopping trip. The food was prepared by the students one day and eaten the next day. They learned about setting tables, serving food, and cleaning up. It is not uncommon that disabled sutdents have never experienced any of these activities.

A questionnaire was given to the students to evaluate the nutrition unit and the majority felt the experience was beneficial and met their particular needs.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
I. Good Nutrition during the teen years. **Objective:** Use knowledge of nutrition to maintain good health status and resistance to disease or infection and to prepare for adulthood.		
1. Knowledge of nutrition prepares a disabled teenager for adult responsibility for maintaining his health status.	1. Keep a daily food diary for a week, listing everything you eat or drink and the quantity. Following this, exchange your diary with a classmate, and rate each other's diaries. Make suggestions for nutritional improvement based on what you learn in class. Discuss the nutritional value of the many "fast foods" available to teenagers.	1. Take a pre-test and post-test on the basic facts of nutrition. Keep another daily food diary for a week and recheck for improvement in your eating habits. Take a food attitude questionnaire regarding your preferences for fruits and vegetables. Discuss the reasons why you do not like or do not eat particular foods.
II. Independence in preparation of nutritious meals. **Objective:** Successfully plan a menu, shop, cook, serve, and eat a nutritious meal.		
1. Students with disabling physical conditions who wish to live independently of their families need a practical experience in managing their own shopping, meal planning, cooking, and serving.	1. Plan a menu for a week. Shop and prepare the food for one meal. Then serve it to a group in your school.	1. Ask the group to evaluate: a. choice of food b. method of preparation c. how the meal was served d. taste and appetite satisfaction.

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NEW YORK STATE CURRICULUM TOPICS

The following are the topics covered in the New York State Curriculum (See ERIC # ED 076 527) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Nutrition Grades K-3

I. What Is Food?
- A. All living things need food and water
- B. Food makes a difference in how we feel about ourselves, others, and the world around us
- C. There are many different kinds of foods
- D. Where do different foods come from?

II. Food Is Used For Pleasure
- A. We all have favorite foods that give us pleasure because we like the way they taste, feel, smell, and look
- B. Food is a part of many happy situations that give us pleasure

III. Food Is Used For Doing Things (Energy).
- A. Food is the fuel for our bodies
- B. Like all fuel, food is used up and must be constantly supplied for our bodies to function

IV. Food Is Used For Building
- A. All living things need food for growth
- B. Each of us grows a little differently, but we all need food in order to grow as we should
- C. Cells are the building blocks of the body
- D. Food supplies the materials necessary for making new cells

V. People Eat Many Different Kinds of Food
- A. Different families eat different kinds of food
- B. People in different parts of the world eat different foods and eat in different ways
- C. We can choose what we eat from what is available to us
- D. We should be willing to eat a variety of different foods

The following are the topics covered in the New York State Curriculum (See ERIC # ED 076 528) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Nutrition – Grades 4-6

I. Many Factors Determine What Foods People Eat
- A. The food patterns of a country or region have evolved from a complex of demographic, social, economic, and cultural factors
- B. Many different food patterns supply the same essential nutrients: whenever men have managed to survive, they have found food which would supply at least the minimum nutrients necessary for survival.
- C. Family and individual eating patterns are the result of a complex of personal and socio-cultural factors.

II. Our Bodies Use Nutrients From Food for Energy, Growth, and Maintenance
- A. Each cell of the body has a need for specific nutrients
- B. Nutrients are delivered to the cells of the body by the circulation, after being derived from food by the process of digestion and entering the circulation by the process of absorption.
- C. The cells of the body change nutrients into energy and into building materials.
- D. The body's need is for nutrients, not for specific foods

III. Food Plays a Role in Growth and Development
- A. Each individual has his own pattern of growth, determined by heredity
- B. Adequate nutrition is essential for an individual to achieve his growth potential
- C. Over or under-weight may result from too much or too little food in relation to needs for growth and energy

IV. There are some criteria we can use in selecting food to meet our needs
- A. The basic four food groups offer a general guide for what kinds of foods we need to eat
- B. Individual needs and concerns will affect the specific foods we choose to eat
- C. Knowledge of the relationship between nutrition and health gives us the basis to select foods that will provide the nutrients we need

V. Food Has Always Been an Important Factor in the History of Man
   A. The success with which man has been able to obtain adequate food has influenced his ability to devote energy to accomplishing tasks
   B. The need for food has influenced wars, revolutions, patterns of settlement and exploration, and other important events in human history

The following are the topics covered in the New York State Curriculum (See ERIC #ED 076 529) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Nutrition – Grades 7, 8, 9

I. Nutritional Status – A part of Physical Health
   A. Dynamic state of the body with regard to intake and outgo of energy and nutrients
   B. Factors which influence nutritional status
   C. Measuring nutritional status

II. What Is a Good or a Poor Diet?
   A. Criteria for evaluating food intake
   B. Are teenagers well or poorly fed?

III. Nutrition in Growth and Development
   A. What is normal growth? What is nutrition's role in normal growth?
   B. The adolescent growth spurt

IV. Weight Control
   A. Factors which affect body weight
   B. The difference between overweight and overfatness
   C. How do you know what you should weigh?
   D. Health implications of obesity
   E. What we don't know about weight control and body fatness
   F. What to do and not to do about overweight

V. Environmental Factors Influence Nutritional Health by Affecting
   --- what foods are available
   --- the quality of those foods
   -- what foods the individual chooses to eat
   A. Effects of technology on the food available
   B. Effects of income on the individual's food supply
   C. Effects of government control
   D. Effects of advertising and propaganda
   E. Effects of political factors

The following are the topics covered in the New York State Curriculum (See ERIC #ED 076 530) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Nutrition – Grades 10, 11, 12

I. Fetal and Infant Nutrition
   A. High nutritional needs during prenatal life and infancy
   B. Nutrition during pregnancy and before pregnancy
   C. Infant feeding

II. Nutrition in an Ecological Context
   A. The problem of food and population in developing nations
   B. Malnutrition in the United States
   C. Obesity – a societal problem

III. New Frontiers in Nutrition
   A. Research into the role of nutrition in health and disease
   B. Space travel – problems of feeding men in space
   C. Nutrition education – helping people to use their resources for good health

IV. Whose Responsibility Is Nutrition?
   A. Nutritional health – an individual, family, community, and international responsibility
   B. Careers in nutrition – related fields

Modules in

Sensory Perception

Sensory Perception K-9

Special Topics in this Module	Objectives
I. Body Image	Develop your ability to move and feel according to your particular needs.
II. Perception of Spatial Relationships	Learn how you relate to objects in the space around you.
III. Improving Ability to Use and Enjoy the Senses	Improve your ability to use and enjoy each of your senses.
IV. Using Science Activities in Learning about the Senses	Use science activities to learn about your senses.

BACKGROUND INFORMATION K-9

Sensory Perception

Physical care of the senses is certainly important to the physically disabled student. Careful medical check-ups are again emphasized as of double concern, since the burden of care for the disability tends to put other, non-life sustaining health care, on a lower priority level. In addition to care of the senses, physically disabled children often need help with a sensory problem or a perceptual-motor problem.

Consideration of problems, and activities for amelioration, should include each of the following areas of perception:

Auditory: reception, association, discrimination, figure ground, closure and sound blending, memory, grammar and syntax.

Visual: reception, association, discrimination, figure ground, closure, memory, perceptual, constancy, position in space, spacial relationships, eye-hand coordination.

Motor: body image, coordination and control, gross motor and fine motor skills.

Body Image

Gross motor development is the progressive ability to coordinate arms, legs, and entire body in a controlled manner. It is best to begin the tasks on the easiest level. The use of the body for simple tasks will lay the groundwork for the more difficult ones and at the same time give the child the recognition and understanding of the body parts involved. This improved perception of one's own body is generalized to other perceptions which in turn affect one's learning ability.

Normal physical motor development follows the general rules of cephalocaudal (head to foot) and proximal – distal (gross body to fine motor). A child goes through the following steps to become a walker: (1) control of the position of his head in space; (2) control of his trunk (back) in space; (3) use of hands and arms for balance and use of materials; (4) creeping and crawling; (5) standing – ability to stand on his own power after getting to that position; and (6) walking.

Some of the major problem areas for children with motor disabilities are: exaggerated physical response to external stimuli; maintaining body balance in space; difficulty with fine motor tasks and caring for his bodily functions; and difficulty in integrating stimuli to allow appropriate responses and/or reactions.

Some positions in which most people relax, such as on the back or stomach can lead to an inability to control or organize their actions and promotes abnormal posturing.

Spatial Relationships – A student who lacks experience in correct perception of spatial relations may not be able to judge how far or how near something is in relation to himself; may have problems with directionality or object-to-object relationships in space, which will result in difficulty with left to right orientation; may show difficulty with placing numerals in arithmatic or in numbering down the paper for a spelling test; may have a poor sense of direction, easily getting lost and often being unable to find his way home from familiar surroundings; may have problems with words that denote space or distance like before, after, left, right, in between, or beside.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
I. Body Image **Objective:** Develop your ability to move and feel according to your particular needs. You can develop your ability to move and feel.	Do as many of the following activities as you are able: 1. Roll with your hands at sides, above the head, with eyes opened and closed, from right to left and reverse, quickly and slowly. Identify major body parts while doing this task. 2. Crawl with your eyes opened and closed. Crawling should be done forwards and backwards, under and over and through objects, slowly and quickly and on various textured surfaces. 3. Sit with and without support on various surfaces and, finally, sit in the proper position for work at a desk with feet on the floor, with straight back, in proper position for work at hand. 4. Walk without support, barefoot on solid surfaces, through mud, on sand, pebbles, water, with your eyes opened, closed. Practice walking heel to toe, starting with your favorite side. Use a drum to help you keep a rhythm. A wooden beam may be used, starting with as wide a board as necessary and narrowing it down to four inches as the balancing skills involved are mastered. On the beam, go forward, backward and side walk. Then the beam should be raised a few inches from the ground and sideways. Then the beam should be raised a few inches from the ground and the above skills attempted. Walking should be experienced under, over and through objects, inside and outside the home. Each skill should be discussed while performing the task.	

BACKGROUND INFORMATION K-9

Sensory Perception: Problems

To varying extents neurological and sensory impairment is suffered by children with muscle disease like Muscular Dystrophy and Myasthenia Gravis, with birth defects of the central nervous system like Spina Bifida, and with traumatic injuries causing paraplegia and quadriplegia.

When recent memory functions are decreased, the teacher should be alerted to the fact that much repetition should be used when the patient is in training to remediate a disability.

Disturbances in certain types of perception are more likely to occur in brain damage that affects the right cerebral hemisphere. They can be tested for by asking the child to copy figures such as a square, a triangle, and a maltese cross. He can also be asked to reproduce from memory a clock face. When disturbances in perception of form exist, these reproductions are distorted. Asking a patient to put on a shirt that is presented to him rolled up with one sleeve inside out is also a useful test.

When perception disturbances exist, the examiner will recognize that the teaching of basic self-care skills by demonstration must be combined with verbal instruction.

Perceptual Problems: Causes

Healthy use of the senses may be impaired by perceptual difficulties which arose because of physical confinement in space to the crib or to one room, lack of stimulation to look, touch, listen, taste, smell, incomplete sensory feedback because of lack of one sensory modality (ex. – inability to touch or feel will deprive the child of the chance to verify what his eyes may register), deprivation of opportunity to receive experiences because of extended hospitalzation. Therefore vastly enlarged opportunities for sensory experiences may be necessary in order to try to compensate for early lack. Or, better still, early education in perceptual and language stimulation, starting from the time of diagnosis of the disability, would help to prevent perceptual problems and ameliorate the unavoidable concomitants of incomplete sensory feedback. At this earliest level, parent education must be given simultaneously so that the child's education can be continuous.

An individual deprived of any one of the sources of information will never know completely what a thing is. Accurate perception depends on input, integration and output.

There is a misconception that other senses are super-acute if a person is deprived of one sense. Other senses develop more (not independently – integrated) depending on how early you train or develop them. If one is impaired, all are impaired. With disabled infants all senses are impaired if one is impaired. Input is impaired. If confined in a hospital, he isn't getting cooing or cuddling, is not seeing beyond the crib, and not learning to interpret a variety of things.

Critical learning periods for language, speech, visual perception, auditory perception, taste, and smell occur during the first three years of life. If they don't develop then, there will be difficulty throughout life. This is an important reason for parents and school to provide an early education program for infants.

They can be trained later, but not as well.

In the case of the physically disabled child, doctors and parents are often overprotective, resulting in restricted movement and restricted activity for learning. Mothers should put infants on the floor to allow and encourage movement, for example, to move toward and feel things through play. Getting input may prevent many of their learning disabilities.

Input comes from the senses: hearing, vision, kinesthetic (tells you where parts of your body are without looking – internal awareness), tactile (touch), taste, smell, and thermal (sensitivity to temperature).

There are critical periods for development of certain skills and for development of the cortex. You can have 20 – 20 vision and not be able to interpret (problems in occipital lobe). Ability to interpret happens after the baby is born. The brain is developed because of interaction among all senses. The purpose of early education is to get infants out of the crib, because otherwise they only learn to interpret what's in the crib area. Motor skills are developed at this time too, and should be developed simultaneously with perceptual skills.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
	5. Run with your hands free and with one or both hands occupied with objects. Run on solid, smooth, rough, hard surfaces, barefoot and with shoes. Speed could be varied on certain paths. Combine running and throwing a ball and walking to become aware of differing rhythms. 6. Jump-Hop at first holding on to something, then independently, without losing balance, while using a drum to change patterns, going forward and backward, over small objects, and from varying heights. Hopping should be done on alternate feet. 7. Use a single or double mirror to name your own body parts, front and back, down to details such as fingers, toes, and nails, with eyes both opened and closed. 8. Feel the various parts of your body and learn the function of each part. 9. Tell what article of clothing you wear on each part of your body. 10. Have someone trace your body on a large paper and you fill in details and clothing. 11. Trace other family members and compare them to your own figure. 12. Make puzzles of people from illustrations of people. Then cut vertically, horizontally, and into irregular segments. 13. Relate your health habits to each body function and its maintenance, like brushing your teeth or washing your hands and face. 14. Draw people, starting with the face, then adding the body, arms and legs and continuing to add details and dimension in time.	

BACKGROUND INFORMATION K-9

Perception

1. **Dysautonomia** – Problem: Non-functioning autonomic system.

May compensate for lack of senses – learn to adapt. Complete evaluation once a year including neurological tests. Relatively indifferent to pain. Varying differences in feeling of pain because of variance in depth of sensation. Caused by neurological deficit. Some patchy sensation on skin. Injury is casually accepted because of their relative insensitivity to pain. Stomach and chest pain is felt. Joint and bone pain is diminished.

Body image – confused picture even in space. Position sense is off. Therefore, exercises for body awareness and coordination are helpful.

In 1970, Helen Sacs, psychologist, completed a five year study on children with dysautonomia and one of her findings indicated that a significant number of children scored lower on the body awareness section than on other parts of the test, commensurate with their age and intelligence level.

Perceptual problems include difficulties in identifying body parts and the relationship between body parts, as well as distortion of body image.

Coordination problems are with gross motor movement rather than fine motor.

Impaired taste perception and impaired temperature perception are experienced.

It is important to include teaching about adaptations as well as awareness of deficits in sensory perception. In science, avoid experiments depending on sensory reactions.

Ears: Heavy production of wax in ears. Remove by usual methods – but if it has accumulated and becomes hard, make a solution of half white vinegar and half water and put a few drops in each ear twice a day to dissolve wax for easy removal with a Q-tip.

Eyes: Lack of overflow tears and resultant corneal ulcerations can cause visual deficits which make it necessary to provide accommodations such as taped lessons, large type reading materials, tutoring, seating arrangements close to teacher or displayed teaching materials. Corneal ulcerations also slow down or limit mobility.

In art, don't play with glitter or powder. Avoid sand. Avoid rubbing eyes.

May have difficulty learning to print well and in spacing letters on the page. Perceptual training should be given to overcome frustrations met in learning. Play activities of younger children should encourage balancing and coordination of movements.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
II. Perception of Spatial Relationships **Objective:** Learn how you relate to objects in the space around you. Learning to judge the space around you can be useful in many ways.	1. Ask your teacher to place a red arrow made out of tape on your desk to remind you of the direction in which are are to proceed. 2. Use color (magic markers) to keep your proper place in arithmetic problems. For example, mark the ones column in red, the tens column in blue, the hundreds column in green, etc. 3. Play obstacle course games. 4. Fit hands and feet into cutouts in different positions to build in handedness and laterality. 5. Put different size cards into their respective envelopes as an exercise in spatial judgment. 6. Play a game such as "How many steps do I need to take to get to the _____ ?"	

BACKGROUND INFORMATION K-9

PERCEPTION
Spina Bifida & Hemiplegia

Perceptual Disturbance:

Perceptual disturbance can occur from the brain damage often seen in these children.

Perceptual distortions can affect behavior. Failure to walk may be attributed to poor motivation, when actually he may not accurately perceive objects in his environment. Some rotate geometric forms 90° in copying.

Besides balance problems and fears (like falling), contradictory cues are received from vision and touch and confuse him.

Another visual-perceptual problem is difficulty in distinguishing foreground from background. Keep environment as visually simple as possible.

Some hemiplegics have difficulty in perception of upright. A hemiplegic who can walk independently is more accurate in judging upright than a hemiplegic who is wheelchair-bound.

Difficulty in Scanning Environment:

Scanning is required . . . in manipulating . . . wheelchairs, and in accurate perception of objects in space, such as location of doors.

Children neglect stimuli on impaired side. Accidents can occur. Such individuals may initially deny having difficulty in performing an everyday visual activity, such as reading a newspaper.

Difference Between Right and Left Hemiplegias:

Left hemiplegias tend to deviate to left and right to the right. Amputees also tend to misjudge perception vertically. Right – slow and show anxiety. Left – impulsive and use defense mechanisms of denial. Loss of verbal skills associated with damage to dominant side, so right hemiplegia often concurs with aphasia. Non-dominant – loss of visual-motor skills. Impairment of verbal skills might hinder someone learning to transfer from a bed to his wheelchair because he doesn't understand instructions or has problems with perception in space. Sounds from several locations may confuse them – speak to them from unaffected side.

Sensory changes sometimes – food doesn't always taste the same. May experience different sensations from involved and uninvolved side, causing confusion.

Intellectual Impairment:

Memory may be impaired – must repeat activities over and over before he can retain them. Teachers aware of this can be more understanding.

Repetition Versus Perseveration:

A brain-damaged child frequently repeats an activity over and over. May use behavior modification techniques to reduce number of perseverations. With modeling added, even better.

Ability to Shift from Task to Task:

Some have difficulty shifting from one task to another. Less frustration if only one activity is taught in each session.

Judgment:

Often impaired in brain damage. Individual with good verbal skills or a good social manner sometimes gives impression of good judgment.

Reasoning:

Decrement in abstract reasoning – may be extremely concrete. Factor of concrete thinking, rather than family overprotection may explain failure to carry over learned activities to home. Anxiety from being given too many tasks. Motivation depends on ability to perform successfully and understanding of relevance of task for his life situation. Immediacy of results counts. Give simple, concrete instructions with many repetitions – Tell and show exactly what to do and when – be patient and respectful of their needs.

CONCEPTS	STUDENT ACTIVITIES

III. Improving Ability to Use and Enjoy the Senses

Objective: Improve your ability to use and enjoy each of your senses.

1. Many activities can improve your ability to use and enjoy your senses.

1. Ask your teacher to choose activities from the following list to help you improve your ability to enjoy your senses. Make a contract agreeing on how many times you will use these activities each week.

1. Keep a checklist showing how often you practiced. At the end of each month rate your own improvement.

Auditory Reception Activities:

1. Participate in simple conversation with tape recorder, pre-recorded by teacher.
2. Listen to stories with visual material – make pictures mentioned in story.
3. Carry out verbal commands.
4. Solve simple riddles.

Auditory Discrimination Activities:

1. Identify environmental sounds.
2. Identify spoken words with visual clues.
3. Extend to finer sound discriminations (place objects in coffee can and discriminate sounds).
4. Rhyming.

Auditory Figure-Ground Activities:

1. Listen to the teacher's directions while other children are talking in class.

Auditory Closure and Sound Blending Activities:

1. Listen to partially presented words and figure them out.
2. Listen to partially presented directions and carry them out.
3. Blend sounds into words.
4. Word family practice.
5. Identify familiar nursery rhymes with key words left out.

BACKGROUND INFORMATION

Remedial techniques:

1. Systematic simplification of task by giving more and more cues until he is able to do item and the systematic reduction of cues until he is able to perform without cues.

2. Study nature of defect, devise methods that demonstrate that he has defect and that its presence is impairing him, and then teach ways of compensating (ex. turn head if one has visual problem on one side).

Body Image:

If a child has a disturbed feeling about himself and his body he may have difficulty following instructions related to the body. Sometimes he cannot localize body parts correctly. He is sometimes not clearly aware what his body parts are doing. Unless they look down, children are not aware when their feet touch the ground due to lack of feeling. Hence they may be afraid of falling.

Critical Events in the Shaping of Basic Systems:

Beyond the ability to extract information from his world, the successful organism must also be able to act upon it. For this, the information sources (sensory systems) and the action sources (motor systems) must be in synchrony. As the organism grows, relationships between systems will change: limbs grow longer and extend farther from the eyes: distance between the eyes increases; more delicate movements may be performed. Coordination between systems must be maintained and improved while these physical changes are taking place. Richard Held in "Plasticity in Sensory – Motor Systems" describes experiments in establishment of visual-motor coordination in immature and adult organisms. Held's results indicate that this process remains "plastic", that is, capable of change or adaptation, even after the organism has reached maturity. In addition, the knowledge that *some aspects of development appear to continue throughout life* provides understanding and direction for those involved in the rehabilitation of patients suffering from neuromuscular disorders.

The correlation entailed in the sensory feed-back accompanying movement – reafference plays a vital role in perceptual adaptation. It helps the newborn develop motor coordination; it figures in the adjustment to the changed relation between afferent and efferent signals resulting from growth; it operates in the maintenance of normal coordination, and it is of major importance in coping with altered visual and auditory inputs, a fundamental role of motor-sensory feedback loop. Motor deprivation through prolonged immobilization causes a decline in performance on perceptual and motor tasks.

CONCEPTS	STUDENT ACTIVITIES
	Auditory Memory Activities: 1. Repeat words in sequence. 2. Retell day's events in sequence. 3. Play auditory sequential memory games such as "I went to the store and bought a" – each person adds an item and repeats all. 4. Play repeating games such as "telephone". 5. Tell sequence of steps in making something. **Sequencing Activities:** 1. Supply missing words in sentence, in poem, or nursery rhyme. 2. Unscramble sentences. 3. Sequence picture stories. **Visual Reception Activities:** 1. Identify "Symbols, colors, letters, numbers, forms". 2. Find what's missing in the picture. 3. Finding what's wrong with the picture. **Visual Association Activities:** 1. Sorting tasks. 2. Classification tasks – what goes with this (iron and ironing board). 3. Sequence card stories. 4. What's wrong with the picture (Pictorial absurdities). **Visual Discrimination Activities:** 1. Design copying games: blocks pegboards beads cardboard letters and shapes flannograph materials parquetry **Visual Figure-Ground Activities:** 1. Find correct path in mazes 2. Find hidden pictures 3. Sorting according to shape, texture, color.

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BACKGROUND INFORMATION K-9

Research related to sensory deprivation which may have application to the limitations experienced by the physically disabled are listed below:

Deprivation of Light:

There is a critical role of light and pattern in the development of the primate visual system. Visual imput seems to be required for *both* the *development and* the *maintenance* of the visual system. That is, a prolonged period of visual deprivation has an effect on vision at any time in a chimpanzee's life, although the effects of deprivation in early life seem to be the most severe.

The retinas of the eyes were damaged by total light deprivation.

Deprivation Dwarfism:

Children raised in an emotionally deprived environment can become stunted. The reason may be that abnormal patterns of sleep inhibit the secretion of pituitary hormones, including the growth hormone.

Social Deprivation in Monkeys:

Maternal care has long been known to influence emotional development of infants. Studies with rhesus monkeys suggest that peer relations may play an even more decisive role. The monkey's capacity to develop normally appears to be determined by the 7th month of life. Animals isolated for six months are aberrant in every respect. Play with peers seems even more necessary than mothering to the development of effective social relations.

Environmental Determinants of Complex Behavior:

The ability to deal effectively with a constantly changing world seems to depend upon experience with the environment . . . "Enriched" animals are superior to siblings reared in impoverished surroundings on several measures of learning ability. The experience with a complex environment affects the size and number of synapses, the basic links through which nerve cells of the brain communicate with one another.

Many effects of a complex environment are not dependent on age. Adults continue to show many brain changes which occur in the young, and many processes continue throughout life indicating that something can be done for deprived individuals of any age, even though early intervention usually has a greater effect on the future.

Wheelchair-bound

Subjects moving actively through a scene showed a degree of adaptation to prisms whereas subjects moved passively did not.

CONCEPTS	STUDENT ACTIVITIES

Visual Memory:

1. Look at designs for five seconds, go to the board and reproduce them.
2. Develop tactual ability and recall through tracing words, etc. on screen, board, sand, etc.
3. Concentration games (like television shows).
4. Memory for designs (expose design, letter, word for 5 seconds – child reproduces it).

Perceptual Constancy:

1. Sorting according to size, etc.
2. Marking all the circles (etc.) on a page, each one a different color, size, etc.

Position in Space Activities:

1. Games that help differentiate right from left:
   a. Looby Loo
   b. Hokey Pokey
2. Taping or marking right and/or left hand.
3. Kinesthetic tracing of problem letters, numbers and words.
4. Find the one that is going the other way.
5. Chalkboard exercises moving from left to right.

Spatial Relationships Activities:

1. Learn body parts.
   a. Finish the man drawing
   b. Trace another child on brown paper.
2. Following obstacle course.

Visual Motor – (Eye-Hand) Coordination Activities:

1. Sorting
2. Tracking exercises
3. Draws in air.
4. Color, paint, fingerpaint.
5. All manipulative activities – pegs, tinker toys, etc.
6. Stencils and templates.

CONCEPTS	STUDENT ACTIVITIES
	Body Image – Body Schema, Body Concept: 1. Outline other child on brown paper. 2. Play Simple Simon. 3. Touch body parts – (his own body, other child's and to another object). 4. Paper dolls. 5. Finish man drawings. 6. Move through space via obstacle courses. **Fine Motor Activities to practice:** 1. Self help skills – buttoning, snapping, etc. 2. Cutting – straight, curved, angles. 3. Placing and pasting. 4. Tracing templates. 5. Handling small objects (nuts and bolts, etc.). 6. Screwing caps on plastic bottles, stringing beads, sewing cards. 7. Clay work.
IV. Using Science Activities in Learning About the Senses **Objective:** Use science activities to learn about your senses. **Science activities can help you learn more about using your senses.**	1. Have a combined Science and Health Project and choose one or more of the following activities: **SEEING:** 1. Film Strips on eyes – sight – care of eyes. Prepare child for eye test. 2. Eye model to show each separate part – Learn functions. 3. Necessity of eyes to perceive our physical world – Blindfold a child and test ability to maneuver (exercise care!). 4. List safety measures to care for eyes. 5. Learn about the physics of light and color. 6. Learn to recognize various symptoms of possible eye problems, e.g., close work, blinking, eyelid crusted, headaches, etc. 7. Tie in good nutrition as important to healthy eyes and eyesight (Vitamin A). 8. Demonstrate "shutter action" of pupil using flashlight. 9. Build and paint a color tree to learn to perceive the range in the color spectrum. 10. Use convex and concave lenses to illustrate how light rays can be concentrated or diffused. Compare to lenses of eyeglasses. 11. Give informal eye test on a chart designed and printed by students. 12. Test for color blindness. (One out of 25 males, one out of 200 females are deficient in color perception.) 13. Make posters on: Eye Care; Symptoms of Eye Difficulties
	STUDENT SELF-EVALUATIONS 1. Have an Inter-class health quiz competition as a culminating activity.

CONCEPTS	STUDENT ACTIVITIES
	HEARING: 1. Film strips on ears – hearing – care of ears. Prepare for hearing test. 2. Ear model – become familiar with structure and function. 3. Physics of sound – How scund waves travel using tuning forks, explain vibrations and show them on water. 4. Learn to distinguish sounds, e.g., different musical instruments. 5. Use swimming pool to study sound waves (in H_2O). 6. Get information on Sweep Check Hearing Test given on pure tone audiometer. 7. Stress safety measures and care of ears – avoid loud music and noise, no objects in ears, too. 8. Tie in good nutrition with healthy ears and good hearing. 9. Make a model from clear plastic filled with colored liquid to explain how semicircular canals maintain balance. 10. Make posters on care of the ears. **TASTING:** 1. Tongue map – there are 4 basic tastes and everything we eat is a combination of sweet, salty, sour, bitter – show map and location of areas. 2. Test various foods by placing bits on toothpicks and touching to specific areas. (good taste buds in mouth).

HELPFUL TEACHER REFERENCES USED BY HEALTH PROJECT COMMITTEE

SENSORY PERCEPTION

Bornstein, Joan. Outline for Remediation of Problem Areas for Children with Learning Disabilities. Chicago: The National Easter Seals Society for Crippled Children and Adults, Nov. 1972.

Frierson, Edward; Barbe, Walter. Educating Children with Learning Disabilities. New York: Appleton-Century-Crofts, 1967.

Held, Richard. Plasticity in Sensory - Motor Systems. Scientific American, November, 1965, 213 (5) p. 84-94.

Ruhde, Janet. Evaluation of the Physically Handicapped Child.

NEW YORK STATE CURRICULUM TOPICS

The following are the topics covered in the New York State Curriculum (See ERIC #ED 075 435) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

SENSORY PERCEPTION

Grades K-3

I. Our Basic Senses
   - A. Seeing
   - B. Hearing
   - C. Other Senses

II. Our Eyes and Vision
   - A. Function of the eye
   - B. Protection and care
   - C. Testing Vision

III. Our Ears and Hearing
   - A. What our ears do for us
   - B. The nature of sound
   - C. Protection and care
   - D. Testing hearing

The following are the topics covered in the New York State Curriculum (See ERIC #ED 075 436) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Sensory Perception

Grades 4-6

I. The Senses

II. Interrelationship of Senses

III. The Special Senses
   - A. Vision, the sense of sight
     1. The parts of the eye
     2. How we see
     3. Two common defects of vision
        - a. Near-sightedness (myopia)
        - b. Far-sightedness (hyperopia)
     4. Color perception
        - a. How we see color
        - b. Defects of color perception
        - c. Color perception tests
     5. Visual acuity tests
     6. The development of vision
     7. Care of the eyes and vision
        - a. Eye difficulties
        - b. First aid for eye injuries
        - c. Eye health and general health

B. Hearing, the sense of sound
   1. How we hear
   2. How the ear helps maintain balance
   3. Hearing defects
   4. Care of the ears and hearing
   5. Tests of hearing

C. The sense of taste and smell
   1. Tastebuds in the tongue
   2. The cells of smelling sensations in the nose
   3. How we smell substances
   4. How we taste substances
   5. Care of the organs of taste and smell

D. The skin sensations
   1. The structures of skin
   2. The four skin sensations
      a. Pressure, touch and pain
      b. Heat and cold
      c. The skin sensation

IV. Sensory Perceptions and General Health

The following are the topics covered in the New York State Curriculum (See ERIC #ED 075 437) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Sensory Perception

Grades 7, 8, 9

I. Vision
   A. Development
   B. Interpretation of visual stimuli
   C. Visual acuity
   D. Refraction
   E. Strabismus
   F. Eye glasses and lenses
   G. Diseases of the eye
   H. Cataract

   I. Corneal transplants
   J. Visual handicap and blindness
   K. Visual discriminations
   L. Color blindness
   M. Eye specialists
   N. General care of the eyes

II. Hearing and Sound
   A. Sound
   B. Position
   C. Motion sickness
   D. Ear "popping"
   E. Auditory discrimination
   F. Urban sounds and health
   G. Hearing problems
   H. Classifications of hearing losses
   I. Aids for the hard of hearing and the deaf
   J. Ear specialists
   K. General care of the ears

III. Other Senses
   A. Smell
   B. Taste
   C. Skin sensations
   D. Kinesthesis
   E. Equilibratory senses

Modules in

Dental Health

Dental Health K-9

Special Topics in this Module	Objectives
I. Dental Health Needs of Disabled Students	Deal with your special dental needs by following four steps:
A. Regular Dental Care	Get regular yearly dental care.
B. Good Oral Hygiene	Clean your teeth and gums thoroughly daily.
C. Nutritious, Balanced Diet	Eat foods from each of the basic four groups daily.
D. Communication with Parents	Explain your special needs to your parents.
II. Science Activities (K-6) and Dental Health	Learn about Dental Health through Science activities in the Elementary grades.

I. Dental Health Needs of Disabled Students

General – In their search for needed assistance, many parents of disabled children think only of medical and educational services. Dental care is often forgotten, or if it is considered, it is thought of as something that can be put off until a future time. This may be harmful because dentistry does have an early and important role in the rehabilitation of children.

Many of the children are not responsible for their own dental care. They rely on their parents. Neglected and missing teeth can affect the children's speech. They may not be understood when speaking. This can affect their future happiness and ability to get along with others.

Except for patients with Down's Syndrome, who are reported to have fewer caries and earlier periodontal disease, there is said to be little evidence that dental disease is affected by a handicap, but the disabled are said to often fail to receive a normal amount of dental care. Stressed is the role of plaque in the development of caries and periodontal disease. Recommended are the elimination of sweet snacks, fluoridation of water, tooth cleansing by brushing and flossing by the child or attendant adult with adaptations for various handicaps necessary, and professional dental care.

1. **Dysautonomia** – These children often have fewer cavities but find it difficult to tolerate dental care because they have a tendency to gag, have swallowing difficulty, have excessive secretions and can vomit easily. When children are young and still have their primary teeth, habits of running the tongue over the teeth can develop and can cause an ulceration on the tongue. Also, when the back teeth erupt, occasional ulcers appear on the cheeks. The dentist can make a smooth plastic cap to fit over the offending tooth. In rare instances it has been necessary to extract the tooth. Discoloration of teeth is usually due to frequent anti-biotic treatment when children are very young. Tetracycline can cause the teeth to have a grayish appearance.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
I. Dental Health Needs of Disabled Students		
I. To deal with the special dental needs of physically disabled students, the most important steps are:		
Objective: Get regular yearly dental care.		
A. Regular dental care.	1. To find a dentist who treats children, or is a specialist in dentistry for the physically disabled call the District Dental Association of the American Dental Association for a recommendation. 2. Discuss what special accommodations are important to make it easier to get care: ramps, wide doorways, dental chairs with removable arms, etc. 3. Ask your dentist for a fluoride treatment.	
Objective: Clean your teeth and gums thoroughly daily.		
B. Good oral hygiene: brushing, flossing, rinsing.	1. Make a chart and check off each of the following dental routines you follow each day: a. after every meal clean teeth and exercise gums thoroughly with a soft nylon brush with rounded bristles – to remove food particles and plaque. b. use non-abrasive fluoride toothpaste. c. use aids to make cleaning easier when necessary: electric toothbrush handle extender	1. Draw posters showing how teeth help you to chew food well, speak clearly, and give you an attractive appearance. Make signs for a dental bulletin board listing these enemies of good dental health: mouthbreathing causes depositing of tartar tongue thrusting causes displacement of teeth (swallow by curling tongue up instead of thrusting it forward)

BACKGROUND INFORMATION K-9

2. Spina Bifida – Usually the children who have received a great deal of medication (especially tetracycline) when very young have discolored teeth. Children with a seizure disorder who take Dilantin often develop hyperplasia of their gums, which means the gums become enlarged and can partially cover the teeth. They require a very strict regime of oral hygiene. Often, brushing up to six times a day is necessary.

3. Muscular Dystrophy – Children with generalized muscle weakness tend to have malocclussions because the muscles of mastication are affected by their disease or condition. In the later stages of Duchenne Muscular Dystrophy the tongue usually protrudes. Good dental hygiene is difficult to maintain as the arm muscles become weaker. An electric toothbrush is a useful appliance for these children. It is dangerous for these children to receive a general anesthetic for dental care because of their upper respiratory problems.

5. Congenital Amputee – There are implements and accommodations for one-handed use: Y-shaped holder for flossing; can bend a toothbrush by melting; have toothbrush with bristles on both sides; devices can be fitted to hands for those with paralyzed hands.

6. Osteogenesis Imperfecta – These children have poorly formed teeth which have a "mother of pearl" appearance (also called dentinogenesis imperfecta). Because of their fragile bones a simple extraction can cause a fracture of the mandible or alveolus. Dislocation of the jaw bone and subsequent reduction can be a problem because of the bone fragility. This can occur with wide mouth opening during routine dental conservation care. Because of poor tooth formation, extractions are hazardous due to brittle composition of the teeth. The aim of dental care should be toward preventing the need for extractions until after puberty, when bone fragility improves.

8. Congenital Cardiac Conditions – There are no special dental features in these children except in the case of children with cyanosis. The oral hygiene is usually poor and often the gums are receded. It has been noted that there is a greater incidence of white or light patches in the enamel of these children as compared to the non-cyanotic cardiac conditions.

As far as treatment is concerned, prevention of bacterial endocarditis and recurrence of fever in these children is a prime factor. This can be approached in two ways: (1) maintenance of a mouth which is free of infection at all times or (2) prevention of bacteremia (presence of bacteria in blood) which can result from certain kinds of treatment, e.g., exodontia, endodontia and periodontal treatment. In each of these treatment areas specific precautions are prescribed.

9. Hemophilia – Taking care of one's teeth is routine for normal youngsters; for the hemophiliac it is a special concern. The hemophiliac boy must take meticulous care of his teeth, not because they are structurally inferior, but because of the need to avoid the prolonged bleeding that follows extractions. If preventive measures are followed, including attention to oral hygiene, diet, frequent visits to the dentist, and the clotting factors given before extractions, there should be little need for emergency treatment. Many hemophiliacs recall varied difficulties after a tooth extraction: prolonged stays in the hospital; clumsy, painful techniques to stop oral bleeding; transfusions, anemia, fatigue, loss of weight, and as always, absence from home, school or work.

C. Nutritious, balanced diet.

General – The reduction in carbohydrate consumption will reduce dental decay by 96%.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
	bent handle (bend to convenient position by putting it in hot water and bending it while it is soft) try a water pik with a gentle flow or a bulb syringe to clean teeth. d. clean between the teeth with dental tape or dental floss (especially important for those who cannot brush thoroughly) e. if you cannot brush, make a finger cot of a washcloth to clean teeth, or rinse your teeth and mouth with mildly salty water f. get your own toothbrush and cup for school and brush after lunch every day g. if you need someone to help, let him try stabilizing you on the floor between his legs, then brush your teeth from behind; you spit into a basin held under your chin h. brush with special care in the areas most susceptible to decay; they are the upper anterior and lower anterior because of the sublingual glands.	Share with other students the method you have found most efficient for cleaning your teeth. Draw pictures and make a cassette tape recording to describe your method to others.
Objective: Eat foods from each of the basic four groups daily.		
C. Nutritious, balanced diet.	1. Explain the reasons for the following rules for good dental health: Avoid sweets Eat sugarless snacks like: celery, carrot sticks, apples, oranges, popcorn, slice of bologna If you have a craving for sweets, use sugarless cookies, candies, and chewing gum. Eat a nutritious diet that will supply you with all the vitamins and minerals your teeth and gums need (especially Vitamin C for gums and calcium for teeth).	

BACKGROUND INFORMATION K-9

DENTAL HEALTH MATERIALS
GIVEN OUT OR EXHIBITED AT HEALTH SCIENCE FAIR

Cardboard display book "Why a Professional Prophylaxis?" free from
Crest Professional Services
P.O. Box 171
Cincinnati, Ohio 45201

Patient Education Pamphlets from Crest
1. What every mother should know about children's teeth
2. Does your child have too many cavities? Do something about it!
3. Why a professional Prophylaxis?
4. What is a healthy tooth?
5. A new plan to keep your teeth for a lifetime

ADA Patient Counseling Motion Picture Film Library
Film-loop projector and sound, color cassetes. Cassette titles:
Preventive Dentistry
Periodontics
Plaque and Prevention
Periodontal Disease
Trigger Foods
Flossing and Brushing
Use of Water Irrigators
Care of Children's Teeth
Child's First Visit

Available for purchase or rental from:
Professional Research Inc.
660 So. Bonnie Brae Street
Los Angeles, California 90057
or call toll free telephone number:
800-421-0200

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
Objective: Explain your special needs to your parents.		
D. Communication with your parents in order to understand dental problems.	1. Invite your parents to a class on dental health.	
II. Science Activities and Dental Health		
Objective: Learn about dental health by doing science activities in the elementary grades.		
Elementary science activities can help us learn more about dental health.	1. Have a combined Science and Health Project and choose one or more of the following activities: 1. Demonstrate the power of acid made by bacteria working on food to break down enamel. To show this, put a hard boiled egg in vinegar and watch what happens to the sheli. 2. Make a booklet on explaining the following dental health rules with drawings, magazine pictures, or photographs: a. Brush or rinse after eating. b. Never chew on hard objects. c. Avoid thumb-sucking because it can move teeth out of the proper position. d. Eat healthful snack foods e. Use proper utensils, not the teeth, to open bottles or to break strings and threads. 3. Make toothbrush puppets and have each one have a message. Set them up on a stage.	1. Have an Inter-class health quiz competition as a culminating activity.

DENTAL HEALTH PAMPHLETS
from
THE AMERICAN DENTAL ASSOCIATION
Chicago, Illinois

"A Visit To the Dentist."
"Casper the Friendly Ghost Presents: Space-Age Dentistry."
"D is for Dentist."
"Diet and Dental Health."
"Fluoridation Facts: Answers to Questions about Fluoridation."
"Mothers Want to Help."
"Orthodontics Questions and Answers."
"Parents Want to Help."
"Smoking's Impact on Oral Health . . . "
"The Friendly Cub Scout Casper, his Den . . . and their Dentist Fight the Tooth Demons."
"What Happened to Mike?"
"Your Guide to Oral Health."
"Your Teeth and What They Do."

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
	4. Take or make pictures showing functions of teeth: a. eating b. speaking c. appearance 5. Make posters explaining: primary cause of tooth decay – overabundance of sweet foods and drinks. Some children have an abnormal number of cavities. Make a chemical analysis of saliva. 6. Demonstrate how chewing fruits and vegetables helps clean teeth. 7. Sit in a circle. Ask each classmate to give a dental health rule in his own words. Write them down and make drawings. Ditto this and make a coloring book to give out.	

HELPFUL TEACHER REFERENCES USED BY HEALTH PROJECT COMMITTEE

DENTAL HEALTH

Dental Guidance Council for Cerebral Palsy. Your Handicapped Child Needs Dental Care Now. Pamphlet. New York: Author. n.d. (339 E. 44 St., N.Y., N.Y. 10016.)

Green, Albert. A Preventive Care Guide for Multihandicapped Children: Dental Care Begins at Home. Rehabilitation Literature, Jan., 1970, Vol. 31, No. 1. p. 10-12.

Stauffer, Delmar J.; Bechetti, Marilyn B. Preventive Dentistry and The Disabled Child. Pointer. Win 1972. Vol. 17, No. 2. p. 84-89.

Weyman, Joan. Dental Care of Handicapped Children. Edinburgh: Churchill Livingstone, 1971.

Young, Wesley O.; Munk, John R. Dental Care for the Handicapped Child. Rehabilitation Literature. April 1965, Vol. 26, No. 4, p. 98-103.

NEW YORK STATE CURRICULUM TOPICS

The following are the topics covered in the New York State Curriculum (See ERIC #ED 070 989) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Dental Health

Grades K-3

I. Function of Teeth

II. Nutrition for Dental Health

III. Maintaining Oral Hygiene

IV. Dental Caries

V. The Dentist and Dental Health

VI. Healthy Gums and Teeth

The following are the topics covered in the New York State Curriculum (See ERIC #ED 070 990) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Dental Health

Grades 4-6

I. Growth and Development of Teeth
   - A. The structure of teeth
   - B. Types and functions of teeth

II. Nutrition and Dental Health

III. Dental Health Status
   - A. Malocclusion
   - B. Dental caries
   - C. Periodontal disease
   - D. Traumatic injury
   - E. Missing teeth

IV. Maintaining Oral Hygiene
   - A. Techniques of home care
   - B. Safety
   - C. Habits
   - D. Halitosis

VI. Dentist and Dental Health
   - A. Preventive examination and treatment
   - B. Surgical treatment
   - C. Orthodontist
   - D. Fluoridation or topical fluoride application

The following are the topics covered in the New York State Curriculum (See ERIC #ED 070 991) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Dental Health

Grades 7, 8, 9

I. The Nature of the Problems of Dental Health
   - A. Scope of the problems in the United States
   - B. World and national dental health status
   - C. Individual dental health status
   - D. Problems associated with changing status

II. Characteristics of Oral Structures
   - A. Lifetime possibilities
   - B. Importance of teeth
   - C. Uniqueness of two dentitions
   - D. Uniqueness of dental construction

III. The Problem of Dental Caries
   - A. Prevalance
   - B. Proneness of decay
   - C. Process

Modules in

Disease Prevention and Control

BACKGROUND INFORMATION K-6

Disease Prevention and Control K-6

Special Topics in this Module	Objectives
I. Immunizations	Update all your immunizations.
II. Health Habits Based on Special Needs (See Health Status K-6)	Learn five health habits based on your special needs.
III. Using Science Activities to Learn About Disease Prevention.	Learn about disease prevention by taking part in health-science activities.

BACKGROUND INFORMATION K-6

I. Immunizations

General – Required in New York State for School admission to any public, private, parochial, nursery school, kindergarten, elementary, intermediate, or secondary school: a physician's certificate stating the student has received the required immunizations for:

Polio
Diphtheria
Measles Vaccine (rubeola)
German Measles Vaccine (rubella)
(Under the age of puberty)
Mumps Vaccine

For certain children immunizations are countraindicated. This is usually determined by their physician and must be verified in writing by the school administrator.

It is advisable to mount a campaign to update the basic immunizations of all the children. Children with physical disabilities may have been hospitalized for surgical procedures at the time that they should have had routine immunizations.

Regular medical check-ups are also overlooked by some parents because they seem to concentrate on the area of disability, and because they spend so much time visiting specialists that they do not think of ordinary medical and health routines as being important.

The importance of regular medical check-ups and routine immunizations was investigated by the students at Human Resources School. Charts were kept by each group. Parents were apprised of the schedule of immunizations and a follow-up contact was made by the nurse-teacher on the individual medical record of each child. A prominent area of the Health-Science Fair charted the results of our campaign and gave parents additional information emphasizing the importance of immunizations and check-ups.

Protection against influenza is also important for all physically handicapped children.

1. Dysautonomia – Because these children are susceptible to respiratory infections, protection against all the childhood diseases should be given.

3. Muscular Dystrophy – Proper immunizations are a must, since it has been noted that the dystrophic child loses a "grade" in function whenever he is confined to bed even for a short period of time.

9. Hemophilia – They should receive all routine immunizations – those which are injections should be given with a very fine needle followed by gentle pressure over the injection site for at least five minutes.

II. Health Habits Based on Special Needs

Hygiene

General – Children using wheelchairs have to be extra conscious of cleanliness because their hands get very dirty from the wheels of their chair if they are not careful when pushing their chair. All wheelchairs have rims on the wheels to use for pushing so that hands do not touch the tires. However, children in their haste often miss the rim and grip the tires.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
I. Immunizations **Objective:** Update all your immunizations. Proper immunizations, sometimes overlooked because of hospitalization or disability-related medical care – are essential for the physically disabled child. **II. Health Habits Based on Special Needs** (See Health Status K-6)	1. Ask your mother to get a complete list of names and dates of your immunizations and boosters from your physicians. Copy the facts on to a chart showing: Your Age / Type of Immunization / Date of Immunization	1. Check your chart with your teacher or SNT to see if you have the following: **Diptheria, Pertussis & Tetanus:** Usually started at 2 months of age. DPT immunizations are given in 3 doses, at 2 month intervals. A booster dose is given one year after the series has been completed (18 months of age). Usually booster dose is given before the child enters school, between four and six years of age. **Rubella Vaccine – (German Measles):** A single dose of Rubella Vaccine is given no earlier than 12 months of age. No booster dose required. **Rubeola – (10 day Measles):** A single dose of the live vaccine is given around 12 months of age. No booster dose required. **Poliomyelitis Vaccine:** The oral vaccine (Sabin) is given in 3 or more doses usually started at 2 months of age. The three doses are given at 2 montly intervals. The boosters are given at 18 months of age and before child enters school. **Mumps Vaccine:** Usually given in a single dose after the child is 12 months old. No booster is required.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
III. Using Science Activities to Learn About Disease Prevention **Objective:** Learn about disease prevention by taking part in Health-Science activities. 1. Through a combined health and science curriculum, knowledge about disease prevention is gained.	1. Have a combined Science and Health Project and choose one or more of the following activities. 1. Make charts and posters explaining: How are germs spread? What is disease? What are symptoms? 2. View and discuss the Encyclopedia Britannica filmstrip series: Learning About our Health. 3. Read and dramatize parts of biographies of "Health Heroes". 4. Make a list of the most common diseases, their symptoms, prevention and/or treatment. 5. Learn to use the microscope and microprojector. 6. Make a complete individual immunization record for yourself. 7. Make clay models of various types of bacteria. 8. Learn the definitions of: communicable disease, non-communicable disease, contagious, incubation period, inoculation. 9. Make a time line of diseases which have afflicted mankind. 10. Make a time line of great scientists who have discovered and fought diseases. 11. Discuss the symptoms, incubation period and treatment of childhood diseases when and if anyone in class contracts one.	1. Have an inter-class health quiz competition as a culminating activity.

BACKGROUND INFORMATION 7-9

Disease Prevention and Control 7-9

Special Topics in This Module	Objectives
I. Understanding the Difference Between Physical Disability and Contagious Disease	Define each and explain the difference between physical disability and contagious disease.
II. The Seriousness of Venereal Disease	Gain awareness of the seriousness of V.D. in order to prevent the damaging consequences.

BACKGROUND INFORMATION 7-9

I. Understanding the Difference Between Physical Disability and Contagious Disease.

General – It is a common fallacy that children with a chronic illness have a "catching" or a contagious disease. Children with chronic disabling conditions are as susceptible to contagious diseases as are all children. The chronic disabling diseases such as described in this curriculum are not of the contagious or "catching" type. Many of the physical disabilities are congenital, acquired or caused by a traumatic injury.

See "Health Status 7-9, Physiology of the Different Disabilities."

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
Disease Prevention and Control **I. Understanding the Difference Between Physical Disability and Contagious Disease.** **Objective:** Define each and explain the difference between physical disability and contagious disease. 1. There is a difference between a physically disabling condition and a contagious disease.	1. Define what is meant by a "physical disability." Define what is meant by a "contagious disease." Invite the school nurse to discuss how infections are spread and how to prevent their spread – i.e.: common cold impetigo conjunctivitis pediculosis 2. In an independent project, investigate the relevant physiology of your disability and share your findings with the class.	1. Find out from your mother (1) whether you have had a contagious disease; (2) the name of the disease and how it could be spread to other children; (3) how to prevent the disease from being given to other children. Report your findings to the class.

II. The Seriousness of Venereal Disease

General – During early adolescence these children are often still relying on their parents/family for a great deal of physical care or having to remain in a protected environment. They are seeking independence, which is common for this age group. Often the wishes far exceed the reality of the situation.

It is important to place more emphasis on venereal diseases which all students are eager to learn about. A great deal of learning takes place within the peer group although this information is not always the most accurate. The fact remains that children do share and discuss their experiences with each other and the disabled student can be an isolate through no fault of his own, therefore missing socialization with peers.

By providing a solid foundation of knowledge in venereal disease the student learns the facts accurately and should feel secure in his knowledge, hopefully reducing the feeling of inadequacy and isolation. A good bank of knowledge will help the student in making a decision about his own behavior as he moves toward a more independent life.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
II. The Seriousness of Venereal Disease **Objective:** Gain awareness of the seriousness of V.D. in order to prevent the damaging consequences.		
1. Physically disabled students should be made aware of the seriousness of Venereal Disease.	1. Take a V.D. Knowledge Test.	1. Write to public health agencies: local, state and federal and obtain as much information as is possible on Venereal Disease.
	2. Invite SNT, school physician to present material and information about Syphilis and Gonorrhea: cause, symptoms, complications, treatment.	2. Plan a panel discussion on V.D. to be presented to class – Divide class into small groups each with their own subject. Plan an exhibit, coordinating art, science, social studies and language arts.

BACKGROUND INFORMATION 10-12

Disease Prevention and Control 10-12

Special Topics in This Module

I. The Importance of Venereal Disease Information to the Physically Disabled High School Student.

Objectives

Be aware that V.D. is on the increase among high school students so up-to-date knowledge is very important for them to have.

BACKGROUND INFORMATION 10-12

I. The Importance of Venereal Disease Information to the Physically Disabled High School Student.

General – Many physically disabled students have been dependent on parents/family for physical care. This has forced them to be in a protected environment. Therefore their exposure to their peer group and peer behaviors is very limited. This causes a certain lack of sophistication and naïvete´ rendering them vulnerable targets for experiences they are unable to cope with adequately, through no fault of their own. A solid foundation of knowledge in the cause and effects of Venereal Diseases is as important for the disabled student as it is for all high school students.

CONCEPTS	STUDENT ACTIVITIES	STUDENT SELF-EVALUATIONS
Disease Prevention and Control		
I. The Importance of Venereal Disease Information to the Physically Disabled High School Student.		
Objective: Be aware that V.D. is on the increase among high school students, so up-to-date knowledge is very important for them to have.		
1. The teenage physically disabled students should be aware of the resurgence of V.D. and the effects that V.D. can have on their physical condition.	1. Discuss and review the more common venereal diseases, i.e., syphilis, and gonorrhea.	1. Review latest reports from the State Health Department, Division of Communicable Diseases for current statistics regarding occurrence of V.D. in the high school student age group.
	2. Invite SNT to present information on what effects V.D. can have on the central nervous system, reproductive system, etc. and review.	2. As a follow-up hold a question and answer session with the school physician to find out how this could affect a person with your disability.
	3. Discuss mode of transmission, symptoms, and importance of prompt and adequate treatment.	3. Form a debate team to present the pros and cons of sexual promiscuity among high school students.
	4. Discuss the methodology used in controlling the spread of V.D. If there is a local V.D. control unit, invite an investigator to the class for a presentation.	4. Invite a psychologist to help you analyze reasons for sexual promiscuity among some high-school-age students.

NEW YORK STATE CURRICULUM TOPICS

The following are the topics covered in the New York State Curriculum (See ERIC #ED 037 735) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Disease Prevention and Control

Grades K-3

I. Cause of Disease
- A. "Germs"
- B. Reservoirs of infection
  1. Man
  2. Animals
  3. Soil
  4. Water
  5. Plants
- C. How germs get to man
  1. Contact (direct, indirect, droplet spread)
  2. Vehicle
  3. Vector
  4. Airborne
- D. How germs enter man's body (portals of entry)
  1. Mouth
  2. Nose
  3. Break in skin
- E. Relationship of ear infections to nose blowing

II. Preventing Disease
- A. Personal actions
  1. Cleanliness
  2. Nutrition and sleep
  3. Care in the use of personal items
  4. Precautions when drinking and eating
  5. Covering nose and mouth when sneezing; cover mouth when coughing
  6. Proper disposal of paper tissues
  7. Use of cloth handkerchiefs
- B. Community action
  1. Sanitation
  2. Public health department
  3. Immunization

III. Some signs of Illness
- A. Symptoms
  1. Sore throat
  2. Headache
  3. Stomachache
  4. Vomiting
  5. Skin rashes
- B. What to do

IV. How Others Protect Us From Illness
- A. Parents and other family members
- B. Teachers
- C. Doctors
- D. Others

The following are the topics covered in the New York State Curriculum (See ERIC #ED 072 365) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Disease Prevention and Control

Grades 4-6

I. The Nature of Disease
- A. Kinds and types
  - 1. Communicable diseases
  - 2. Noncommunicable diseases
- B. Etiological considerations

II. History of Disease
- A. Prehistoric times
- B. Early civilization
  - 1. Roman Empire
  - 2. Hebrews
  - 3. Greeks
- C. Modern Age

III. Modern Approaches to Disease Control
- A. Immunity and immunization
- B. Public health measures
  - 1. Sanitation
  - 2. Research
  - 3. Diagnostic techniques
- C. Health Education
  - 1. School
  - 2. Home
  - 3. Public health education
- D. Treatments
  - 1. General
  - 2. Drugs
  - 3. Rehabilitation

IV. Significance of Disease – Its Control and Prevention
- A. To the individual
  - 1. Personal efficiency
  - 2. Longevity
- B. To society
  - 1. Economics and standard of living
  - 2. Progress
  - 3. Population trends
- C. To the world

The following are the topics covered in the New York State Curriculum (See ERIC #ED 072 366) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Disease Prevention and Control

Grades 7, 8, 9

I. Historical Development of Men's Knowledge of Disease
   - A. Discovery of microbes
   - B. Understanding the nature of disease

II. Ecological Relationships
   - A. The interrelation between life and the environment
   - B. Equilibrium between man and microorganisms
   - C. Epidemiology

III. Communicable Disease
   - A. Modes of transmission
   - B. Body defenses
   - C. Immunity

IV. Resurgence of Venereal Diseases

V. Degenerative Disease
   - A. General nature
   - B. Control

The following are the topics covered in the New York State Curriculum (See ERIC #ED 070 992) and recommended as a starting point for all physically disabled students. Topics requiring special background information and/or special concepts are included in the modules.

Disease Prevention and Control

Grades 10, 11, 12

I. Sources of Infection

II. Preventing the Spread of Communicable Diseases

II. Control Methods

IV. Specific Types of Communicable Diseases
   - A. Childhood diseases
   - B. Disease spread through air
   - C. Transmission

V. Common Communicable Diseases
   - A. Chicken pox
   - B. Measles
   - C. Mumps
   - D. Scarlet fever
   - E. Tuberculosis
   - G. The common cold
   - H. Influenza
   - I. Poliomyelitis
   - J. Hepatitis
   - K. Rabies
   - L. Other diseases spread through contact with infected persons

VI. Public Health Control of Communicable Diseases

VII. Biological Warfare

ANNOTATED BIBLIOGRAPHY FOR SPECIFIC DISABILITIES

AMYOTONIA CONGENITA

Muscular Dystrophy Associations of America. Oppenheim's Disease or Benign Congenital Hypotonia Fact Sheet. New York (1970 Broadway): Author, n.d. 3 pages.

Brief description of the causes, symptoms, inheritance pattern, and progression of Oppenheim's disease, which causes the muscle weakness known as the amyotonia congenita syndrome. Covers medical treatments and research. Offers local MDAA offices as sources of additional information.

Muscular Dystrophy Associations of America. Werding-Hoffman Disease or Infantile Spinal Muscular Atrophy Fact Sheet. New York (1970 Broadway): Author, n.d. 3 pages.

Same format as the MDAA fact sheet on Oppenheim's Disease. General information on Werding-Hoffman disease, which also causes the amyotonia syndrome. Offers local MDAA offices as sources of additional information.

ARTHRITIS

U.S. Department of Health Education, and Welfare. Arthritis. Washington, D.C.: U.S. Government Printing Office, 1968. 6 pages. S .05 per single copy.

Brief historical description of research and treatment related to rheumatoid arthritis, osteoarthritis, and gout. General information on causes and symptoms of the disease. Includes sources of additional information.

BIRTH DEFECTS

National Foundation – March of Dimes. Birth Defects. White Plains, New York (P.O. Box 2000): Author, n.d. 14 pages.

Simple statistical information on the prevalence of common birth defects in the United States and on those which appear after birth. Description of hereditary and environmental influences, prevention, and treatment.

CEREBRAL PALSY or SPASTIC PARAPLEGIA

Seaver, Jacqueline. Cerebral Paley – More Hope Than Ever. New York (381 Park Ave.): Public Affairs Committee, 1969. Pamphlet # 401. 27 pages. S .25 per single copy.

General information on the causes and symptoms of cerebral palsy. Covers special problems related to the disability, child development, and employment. Describes treatment and research.

United Cerebral Palsy Associations. Realistic Educational Planning for Children With Cerebral Palsy. New York (66 E. 34 St.): Author, n.d. 24 pages. & .25 per single copy.

A source of information and guidance for school personnel involved in the psychological evaluation of cerebral palsied children. Coverage includes problems in the administration and interpretation of standardized tests. A bibliography of suggested reading is included.

CHARCOT-MARIE-TOOTH DISEASE

Muscular Dystrophy Associations of America. Charcot-Marie-Tooth Disease or Peroneal Muscular Atrophy Fact Sheet. New York (1970 Broadway): Author, n.d. 3 pages.

Brief information on Charcot-Marie-Tooth disease, presented in the same format as the MDAA fact sheets on amyotonia congenita. Offers local MDAA offices as sources of additional information.

DYSAUTONOMIA

Dysautonomia Association. Educating the Child With Familial Dysautonomia. Brooklyn, New York (32 Court St.): Author, 1967, 15 pages.

A practical guide to help parents deal with the educational lives of their dysautonomic children. Includes information on testing, expectations, relations

ANNOTATED BIBLIOGRAPHY FOR SPECIFIC DISABILITIES (continued)

DYSAUTONOMIA (continued)

with teachers, parents' role in schooling, and different types of schools.

Riley, C. M. Living With A Child With Familial Dysautonomia. Brooklyn, New York (32 Court St.): Dysautonomia Association, 1956, 40 pages.

Detailed information for parents of dysautonomic children. Coverage includes a description of the autonomic nervous system as it is affected by the condition, management of dysautonomic children, heredity, genetics, and research.

HEART DISEASE

American Heart Association. Children With Heart Disease: A Guide for Teachers. Mineola, New York (365 Willis Ave.): Author, 1971, 15 pages.

Presents a general description of the symptoms, hospitalizations, and treatments faced by children with rheumatic fever or congenital heart defects. Suggests practical ways of dealing with absences and the question of vocational counseling. Gives sources of help for medical services and includes a bibliography of teaching aids.

HEMOPHILIA

National Hemophilia Foundation. The Hemophiliac and His School. New York (25 W. 39 St.): Author, n.d. 7 pages.

A source of information for school personnel who deal with Hemophiliac children. Coverage includes symptoms, prevention of injury, and treatment in emergencies. Suggests local NHF chapters as sources of additional information.

National Hemophilia Foundation. New Perspective on Hemophilia. New York (25 W. 39 St.): Author, n.d. 6 pages.

HEMOPHILIA (continued)

Brief coverage of the symptoms and genetic pattern of inheritance of hemophilia, the latter shown traced through British royalty. Description of the work done by the National Hemophilia Foundation.

National Hemophilia Foundation. Psychological Aspects of Hemophilia. New York (25 W. 39 St.): Author, n.d. 14 pages.

Presentation of the problems of overprotection, bleeding and emotions, adaptation, risk from action, maturity, discipline, hospitalizations, treatments, and family relations. Includes a bibliography for additional information.

Vogel, James M. How to Live With Hemophilia. New York: Interbook Incorporated, n.d.

Written by a physican to explain details to be considered in the activities of daily living of the hemophiliac. Contains clear explanation of the blood factors involved and of the hereditary aspects of the disease.

KUGELBERG-WELANDER DISEASE

Muscular Dystrophy Associations of America. Kugelberg-Welander Disease or Juvenile Spinal Atrophy Fact Sheet. New York (1970 Broadway): Author, n.d. 3 pages.

Brief information on Kugelberg-Welander disease, presented in the same format as the MDAA fact sheets on Amyotonia Congenita. Offers local MDAA offices as sources of additional information.

MUSCULAR DYSTROPHY

Muscular Dystrophy Associations of America. Muscular Dystrophy Fact Sheet. New York (1970 Broadway): Author, n.d. 3 pages.

ANNOTATED BIBLIOGRAPHY FOR SPECIFIC DISABILITIES (continued)

MUSCULAR DYSTROPHY (continued)

Brief information on Muscular Dystrophy, presented in the same manner as the MDAA fact sheet on Amyotonia Congenita. Offers local MDAA offices as sources of additional information.

Muscular Dystrophy Associations of America. Patient and Community Services Program. New York (1970 Broadway): Author, 1973, 19 pages.

Detailed description of MDAA services such as testing and diagnosis, therapy, innoculations, transportation, and recreation. Lists services authorized for payment and criteria for eligibility. Includes a listing of MDAA clinics throughout the United States.

PARAPLEGIA

Bundy, Kathryn. What You Should Know About Paraplegia. Adapted from "An Introduction to Paraplegia" by William H. Edward. Washington, D.C.: U.S. Government Printing Office, n.d. 12 pages. $ .25 per single copy.

Written as a practical guide to the new life faced by a paraplegic adult, but presents information valuable to teachers or parents as well. Deals with problems like toileting, skin sores, care of feet, rehabilitation, and sex.

SPINA BIFIDA

Swinyard, C. The Child With Spina Bifida. New York (345 E. 46 St.): Association for the Aid of Crippled Children, 1971. 20 pages.

A general guide for parents, presenting symptoms, causes, treatments, and special problems. Includes clear, simple illustrations. Gives addresses for obtaining translations in nine languages.

SPINA BIFIDA (continued)

Bruce, Margaret, & Veigh, Gretchen. A Practical Guide for Parents of Children With Myelomeningocele. Pittsburgh, Pennsylvania: Allegheny County Easter Seal Society for Crippled Children and Adults, 1972. 32 pages. $2.00 per single copy. *NOTE:* Order directly from Gretchen Veigh, 1065 Findley Dr. E., Pittsburgh, Pa.

A detailed treatment of spina bifida, including numerous topics such as brace adjustment, diet, clothing, medications, exercises, education, and family relations. Illustrated with clear sketches. Included is a glossary of medical terms.